FOUNDRY

EST. 1902 TRADE JOURNAL

VOL. III WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

No. 2351 DECEMBER 28, 1961

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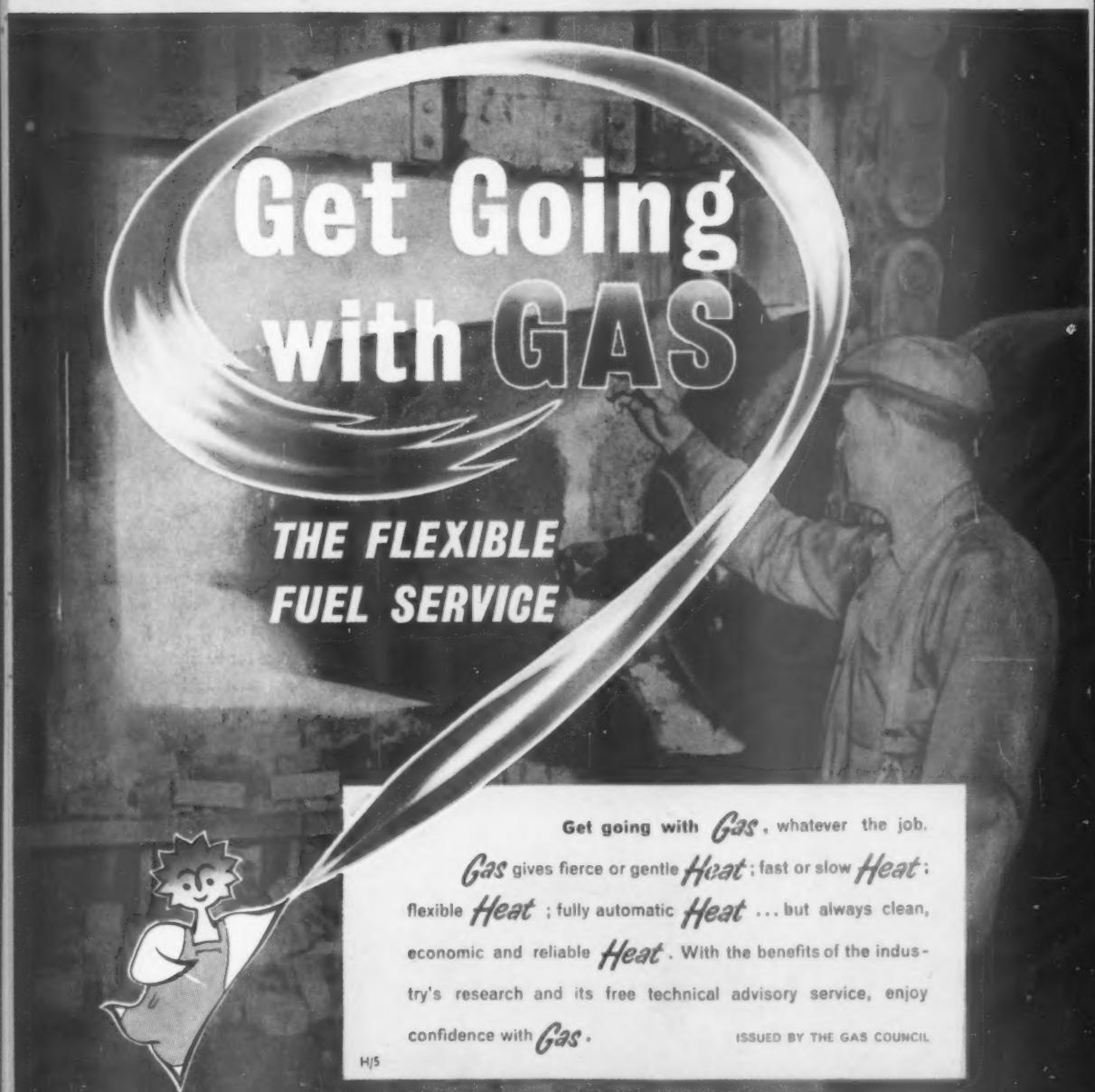
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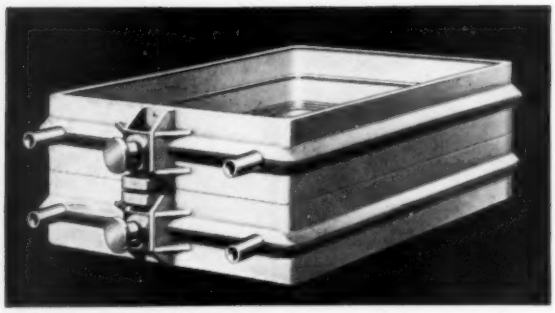

Sooner or later you will invest in Sterling moulding boxes because Sterling give you what you want. It is always possible to buy something a little cheaper but experience teaches that the best is the cheapest in the long run and there is no doubt that Sterling boxes are the best. Sterling were in the forefront fifty years ago. Fifty years of effort have maintained them there. Sterling keep ahead of the job, like only a leader can.

★ *Sterling have technical staff always available to discuss the best box for your particular needs, and this Sterling service is world-wide. Sterling representatives will be pleased to call at your request.*

Sterling Boxes are Light, Accurate, Durable, Strong and Interchangeable. They are made in a wide range of sizes from 9ins. square to anything up to around 14ft. in width to around 27ft. in length for special requirements.
Sterling boxes are made for bench moulding of the simplest kind to the most highly mechanised foundries using the latest automatic machines. They are made for lightly rammed boxes, to boxes used on the latest type of very high pressure moulding machines.

Illustration shows model style 'SLT'

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STERLING FOUNDRY SPECIALTIES LTD., BEDFORD, ENGLAND.

593 Cogent

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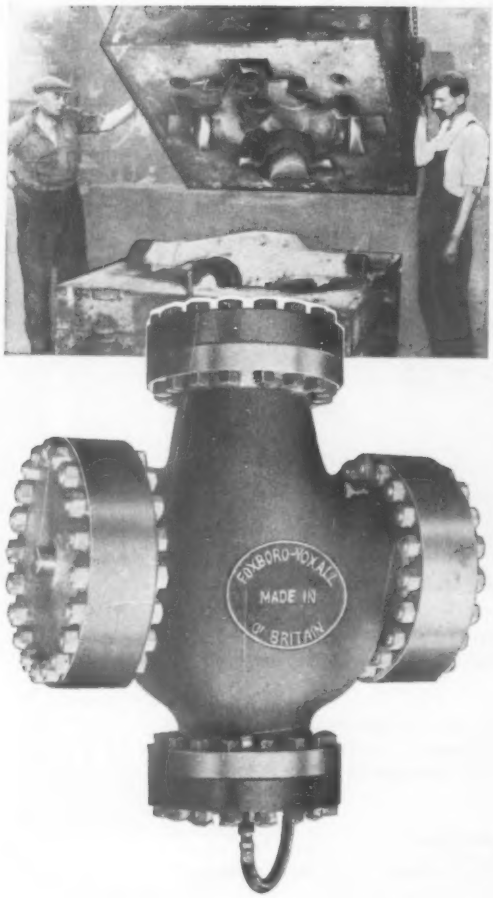

Carbon steel valve casting, weight 3 tons, tested under pressure at 2,000 lbs per sq. in., for oil-installation. Photo of core and casting by courtesy of Messrs Lake & Elliot, Ltd., Iron and Steel Founders, Braintree, Essex.

★ CORE OILS
★ COLD SETTING OILS
★ CORE CREAMS
★ SEMI-SOLIDS
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★ CEREAL BINDERS
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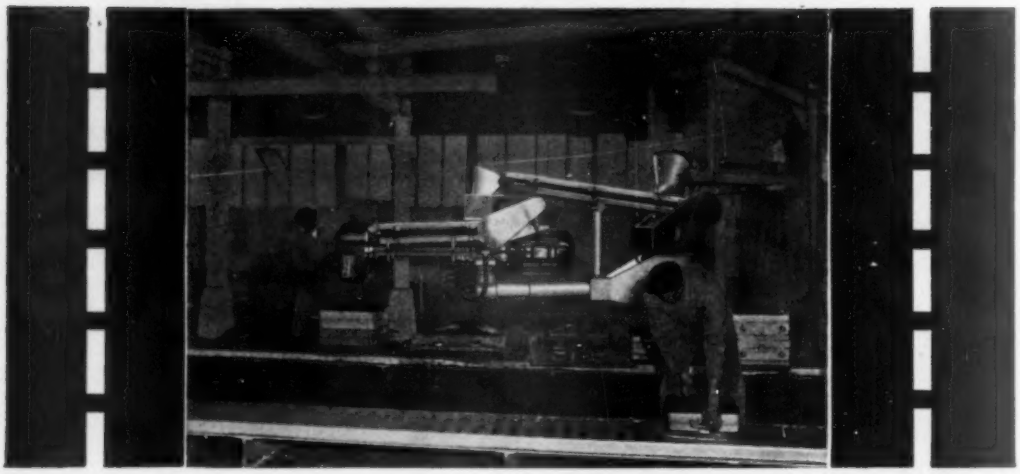
One of our **S.P.M.'s** *in production*

ON JOBBING WORK—BUT UNDER A CONTINUOUS PROCESS!



The above photograph, appearing by the kind permission of The Alliance Foundry Co. Ltd., of Luton, Beds., shows one of our Sand Projection Machines No. 6, which has been installed and is now operating in their Foundry.

It is indeed a recommendation for our machines that this particular Foundry, one of the most modern and progressive in Southern England, catering for medium sized grey iron castings, should have selected our S.P.M. Machine to replace their previous sand ramming unit.

Why not follow their lead!

Send for details, or, for one of our technical representatives if you wish to discuss the installation of the S.P.M. in your factory.

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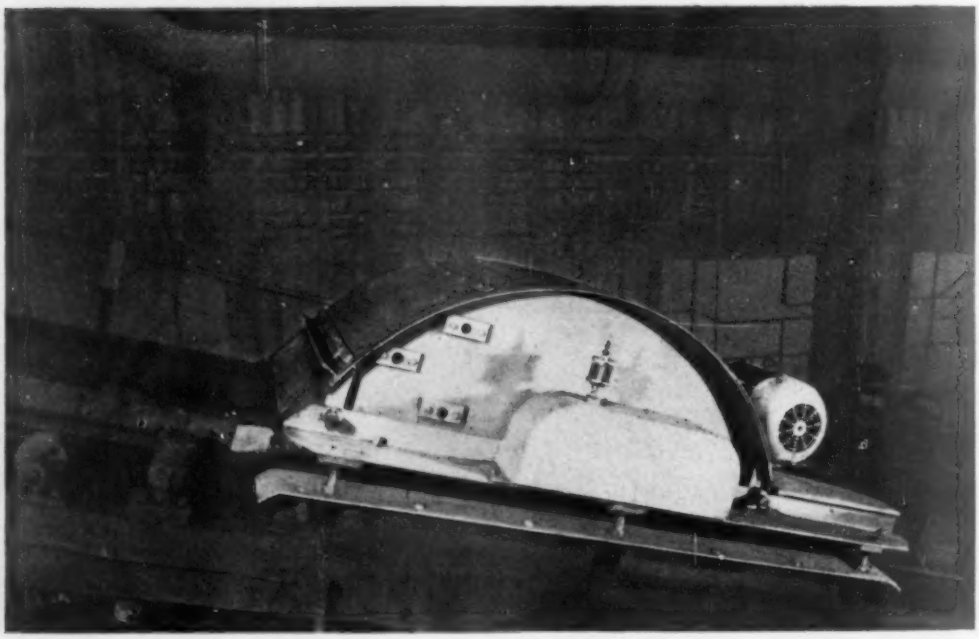
Announcing the C.B.M.

PROVED · PRACTICAL · PRICE CONSCIOUS!



First introduced at the American Foundry Show, Cleveland, in 1958, several of these Aerators have been tried out in various foundries and now we offer them to *you!* We have always been able to offer an efficient Aerator or Disintegrator for any capacity. Now the C.B.M. has arrived !
The C.B.M. Aerator, for which British and Overseas Patents are pending, has these features—

- **Available for any hourly sand capacity up to 100 tons per hour.**
- **Suitable for mounting over any width of flat belt conveyor.**
- **Can be incorporated in plants of our own design or in any plant, by anybody, anywhere.**
- **Can be used in new or existing installations.**
- **All you need is a flat rubber conveyor belt on the distribution side of the Sand Plant.**
- **Can easily and quickly be fitted with adjustable brackets or fixings.**
- **No independent supporting structure, platform or chutes needed—just mount it over a flat belt, inclined or parallel to floor level.**
- **No noise, jolting or vibration.**
- **Saves cost of additional supporting steelwork.**

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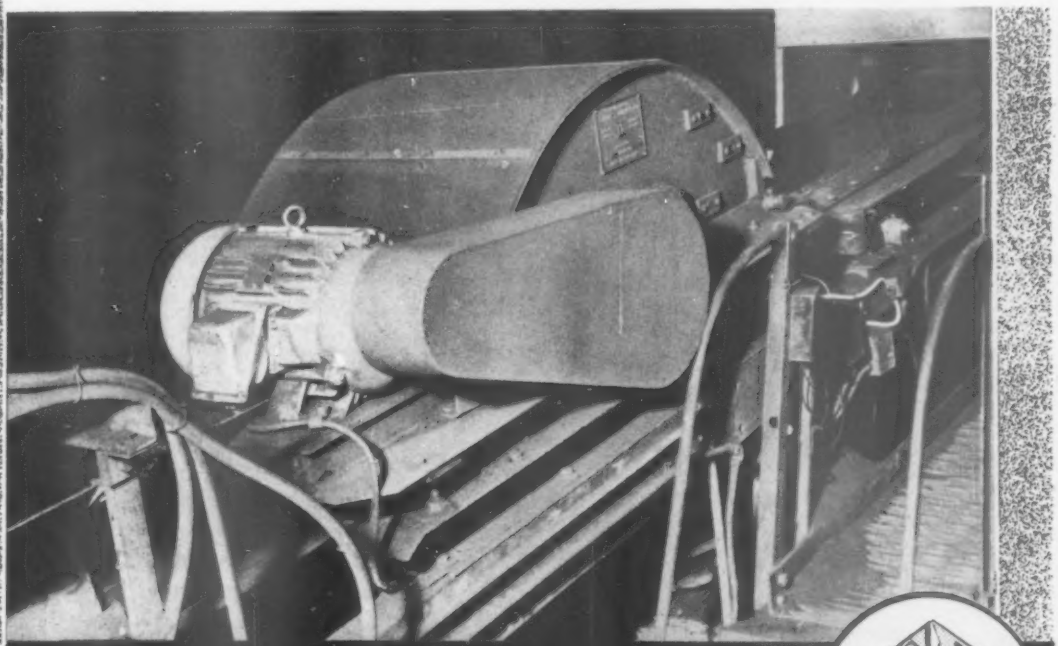
The newest idea in Sand Aeration

- **Saves Elevator height and ideal for low headroom installations.**
- **C.B.M. is lower priced than other Aerators or Disintegrators.**
- **Can be installed in a few hours—cuts erection costs and does not interfere with production.**
- **Single low-powered electric motor drive—5 to 7½ h.p. is usually ample, even for high outputs.**
- **Vee rope drive and fully lubricated chain drive to twin paddles of special patented design.**
- **Machine is fully guarded.**
- **Quickly removable rubber cover for cleanliness, inspection and maintenance.**
- **Reduced maintenance—no pins to replace.**
- **Produces fully aerated "silky" sand for distribution to moulding lines.**

✻ *One of our clients already has four C.B.M. Aerators in their foundry plant—why don't you try one? All we want is a drawing of existing belt conveyor, decking and platform, and confirmed belt width and speed and maximum hourly sand output—we can give you a quick quotation and short dependable delivery.*



OVERSEAS COMPANIES:
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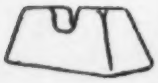
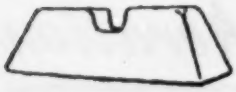


Ingots by Road . . .



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Ingots by Water . . .

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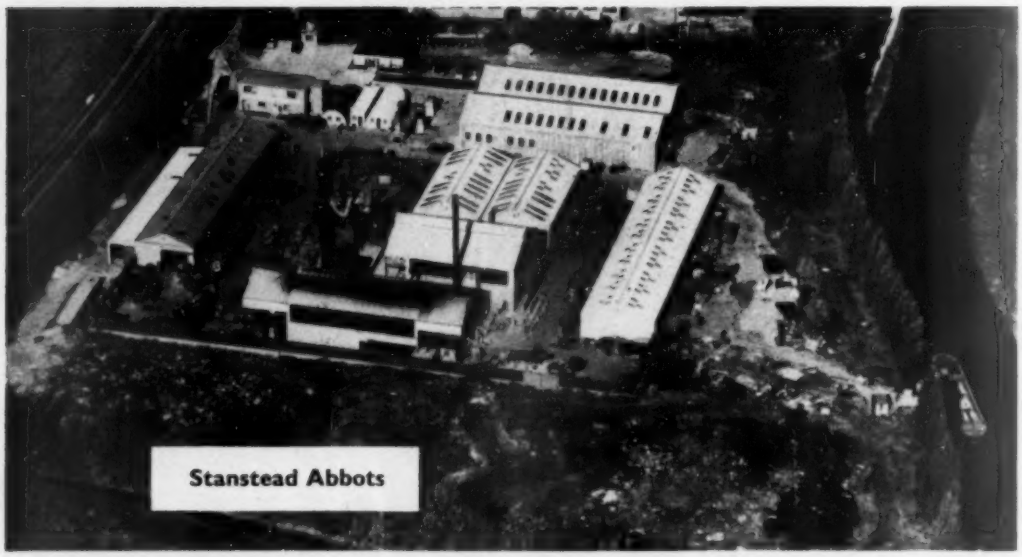

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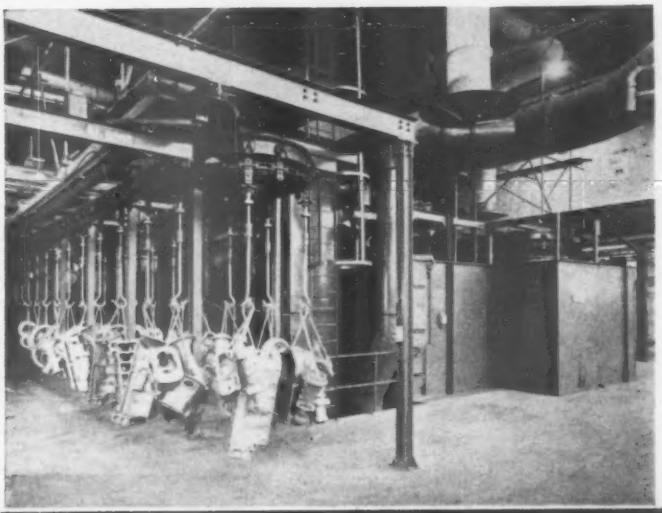

OVERHEAD MONORAIL CONVEYOR ABRASIVE CLEANING PLANTS

One of two Overhead Monorail Conveyor plants installed in the foundry at the Ford Motor Co. Ltd., Dagenham, for cleaning tractor and commercial components. The machine is equipped with six centrifugal blast units, which give complete cleaning coverage to the heavily loaded conveyor hangers passing through the cabinet.

DUAL TABLE WHEELABRATOR PLANTS

The machine illustrated has two 9 ft. diameter tables, and is installed in the steel foundry of the English Steel Corporation Ltd., Sheffield. In this instance, production has been doubled and the handling halved, compared with the cleaning method used previously.

TILGHMAN'S LTD.

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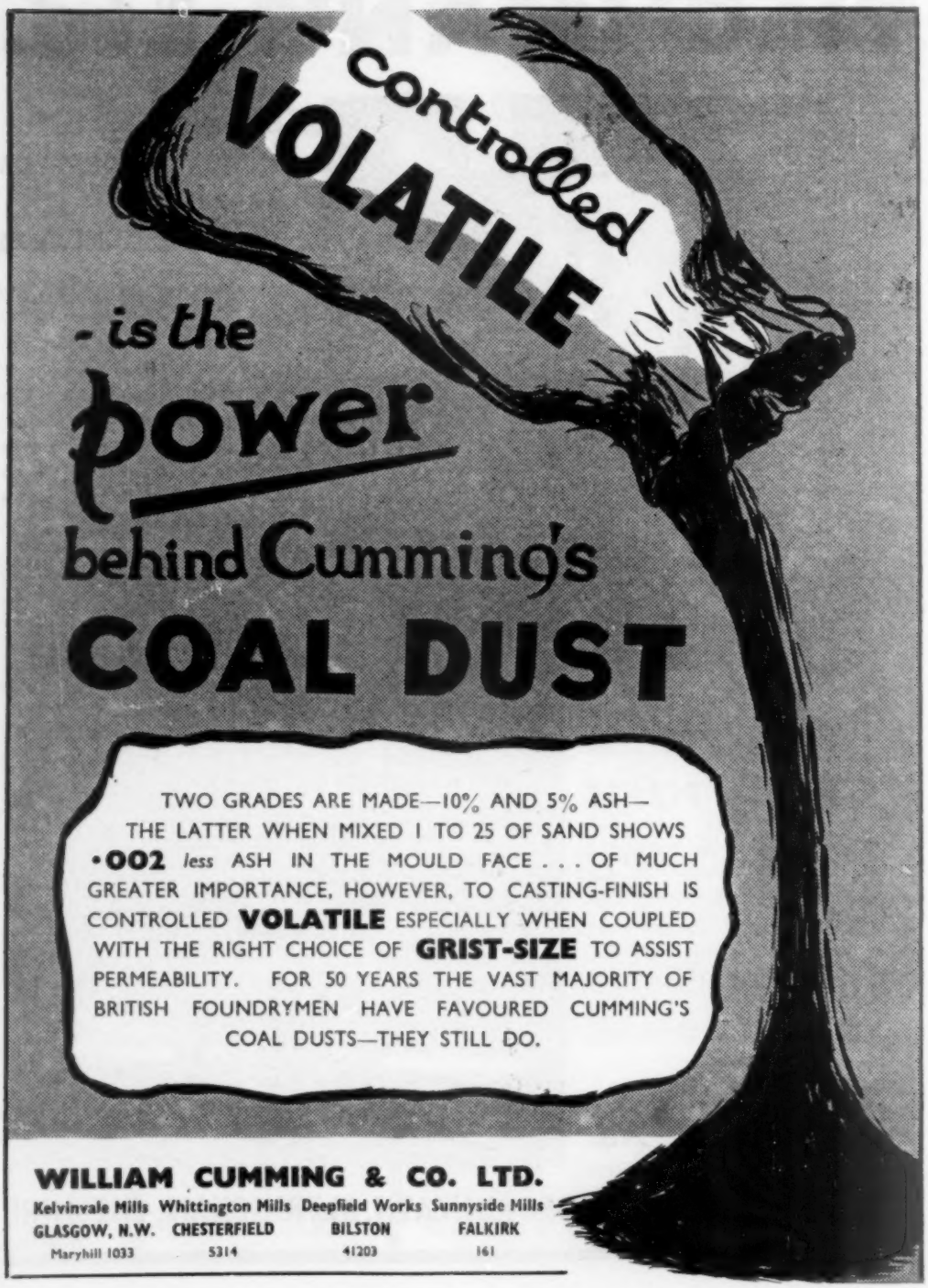
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TWO GRADES ARE MADE—10% AND 5% ASH—
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GREATER IMPORTANCE, HOWEVER, TO CASTING-FINISH IS
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THE PRESENT - CONSTRUCTIONAL are supplying Cupolas to customers in this country and overseas, both Cold Blast and Hot Blast installations, utilising either independently fired or recuperative blast heaters.

THE FUTURE - CONSTRUCTIONAL offer a full range of Melting Plant complete with mechanised handling facilities; Cold Blast Cupolas, Hot Blast Cupolas with either independently fired or Recuperative Blast Heaters, oil fired or electric receivers.

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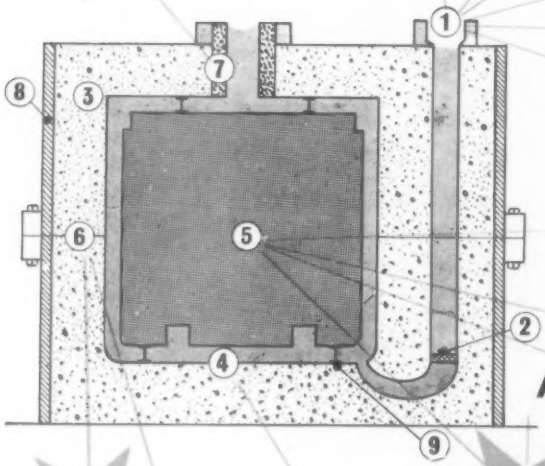

Key to Sectional Drawing of Mould

		Send for booklet No.
1	Metallurgical Control use of Fluxes.	3
2	Clean Metal by using Ceramic Strainer Cores and Discs.	4
3	Coal Dust additional to Facing and Backing Sand.	1
4	Silverskin Blackings, Plumbago and Mould Dressings.	1
5	Cores using Crulin and Crudol Core Binders (Oil Bonded, Air Setting Cereal or CO.2 Binders).	2
6	Moulds Parted with Beecro Silica Free Parting Powder or Beecrol Parting Liquid.	1
7	Casting Feeding with Alsica Exothermic Feeder Heads.	4
8	Moulding Boxes supplied by B.F.U. Chaplets, Studs, etc.	5

is provided by—

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Sole Agents for The Vortec Foundry Machines.

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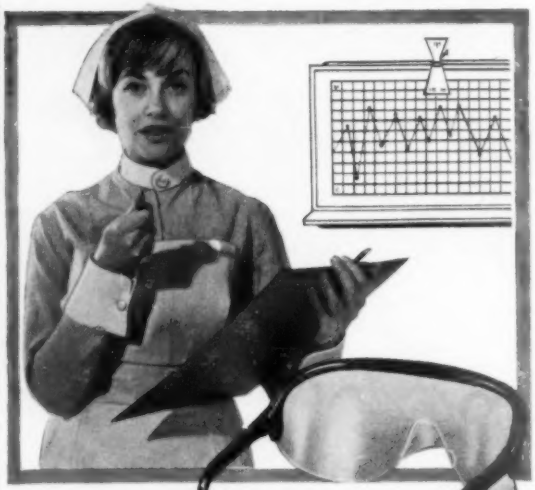
S.14



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When complete enclosure is unnecessary, some workers, particularly younger women, are inclined to discard safety goggles because their head bands could spoil hair styles. No amount of lecturing will persuade them otherwise. The answer to this problem is quite simple. Give them Birshields, with their spectacle-type frames. Their cost is only 5/- a pair, and as with all other Elliott safety goggles, the Celastoid flameproof, shatterproof, splinterproof windows are replaceable. For this type the windows are 1/9d. each.

WHEN COMPLETE CLOSURE IS NECESSARY

LEFT—Birflex—4/6d. per pair. Spare windows 1/6d. each.
RIGHT—Supaflex—designed to be worn over spectacles 5/- each, spare windows 1/9d. each.

E. Elliott Limited

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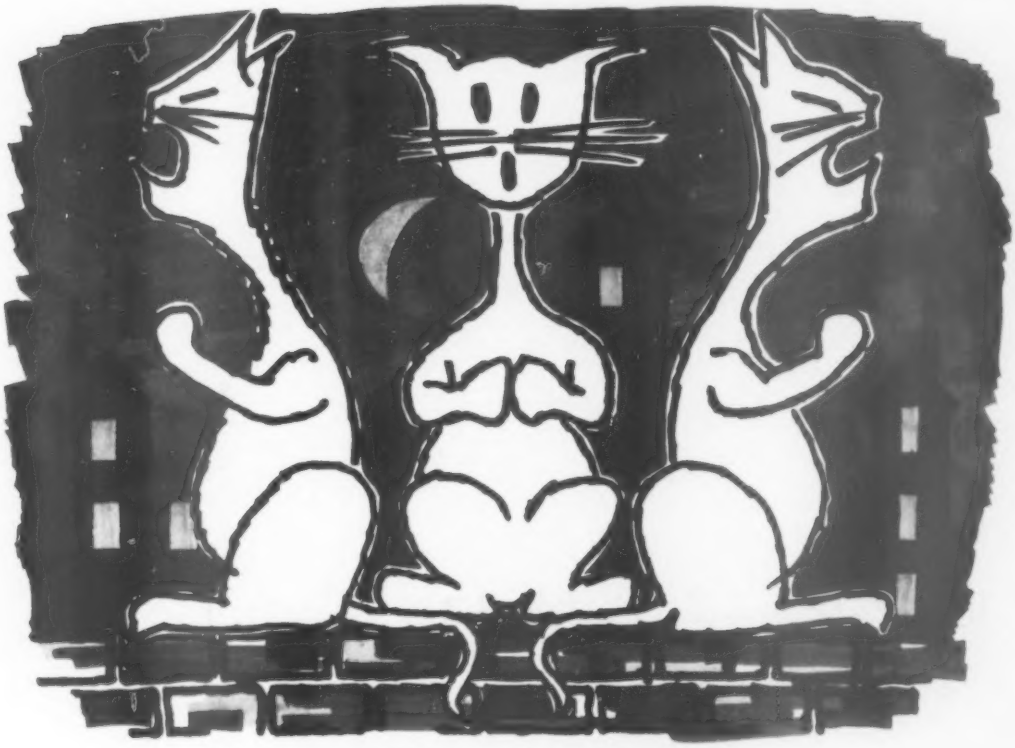
A tale of seven cats . . .



CATASET

Here's a fine set of Cats!—a range of Air Setting Resin Binders specially bred by Catalin for use for cores and for mould facings backed up with regular moulding sand. With simplified and improved accelerating systems they give a better, cleaner finish and a big reduction in time and fettling. Foundry managers like to have these Cats around—they save them so much money. Why not set them to work for you

SIX MORE CATS FROM CATALIN

CATALAC Flame and Air Set Sprays give a good casting finish and a clean strip. Foundry managers find that this kind of Cat keeps fettling down to a minimum.

CATACORE the specialised quick-baking binder. Here's a Cat that makes a core that makes foundry managers purr with satisfaction because it gives them faster, smoother, cheaper cores.

CATAMOLD is a range of powdered Shell-Moulding Resins. All the Cats in this family produce excellent shell mouldings, without 'peel-back'.

CATABOX This Cat will give you a choice of resins for the Hot Box process. There are Furane type or single stage phenolics. Catabox specialises in speed and quality.

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CATACOTE Better casting is this Cat's business—a cool Cat for the cold pre-coating of sand—for better shells at far less cost than conventional resins.

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4. **RADIUSED INNER CORNERS**—A detail refinement which improves performance.
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It pays to bush with

B·A·C

BUSHES

Save scrap!

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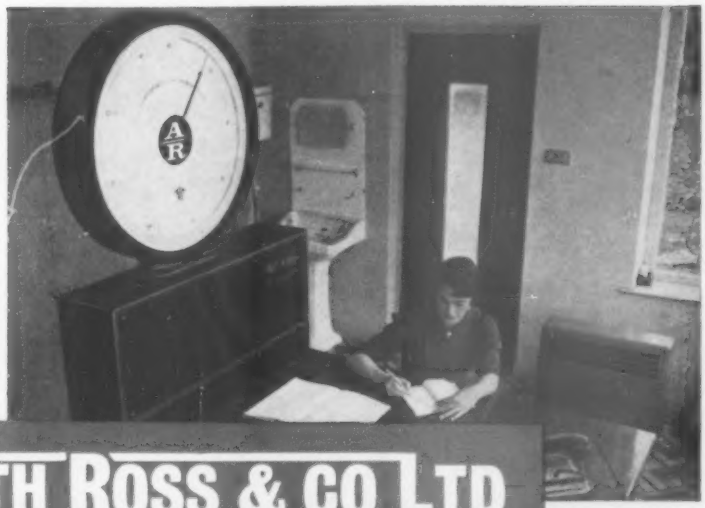
Stage by Stage...



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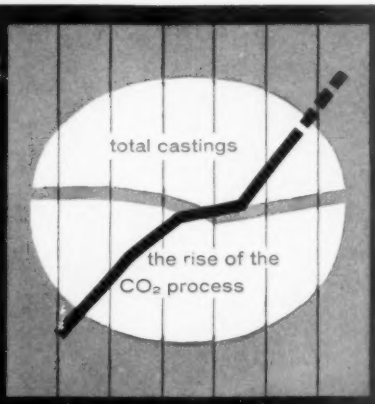
the **productivity** of the CO_2 process for making **better** cores and moulds **faster**



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consistency

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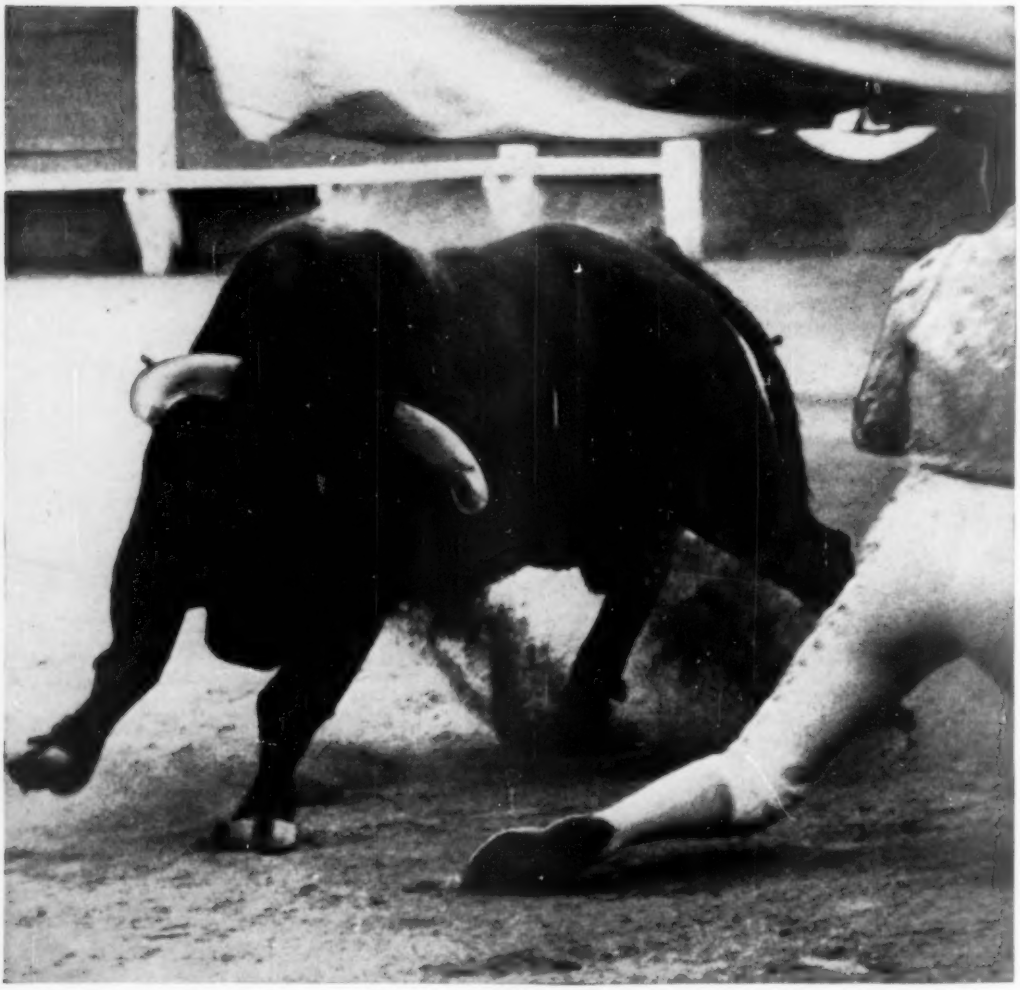

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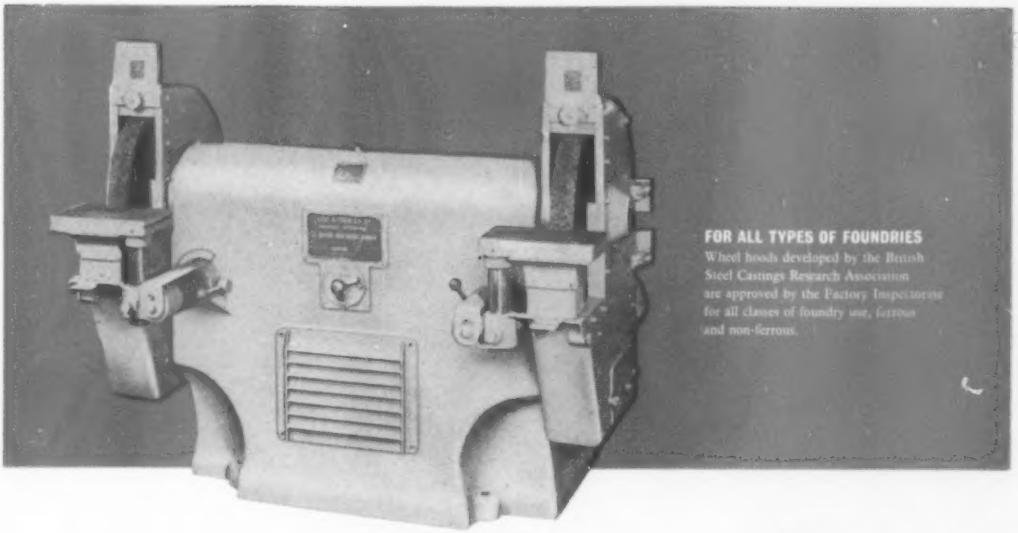
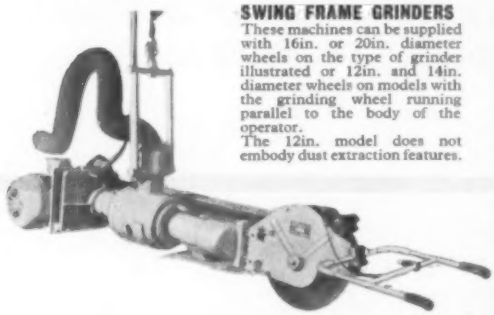


FOR ALL TYPES OF FOUNDRIES
Wheel hoods developed by the British Steel Castings Research Association are approved by the Factory Inspectorate for all classes of foundry use, ferrous and non-ferrous.

HIGH EFFICIENCY GRINDING COMBINED WITH HIGH EFFICIENCY DUST EXTRACTION

PEDESTAL GRINDERS
Luke & Spencer manufacture a large range of pedestal and swing frame grinders which incorporate the latest developments in efficient dust extraction.
Single or double ended pedestal grinders can be supplied with wheels ranging from 12 inches to 36 inches diameter.



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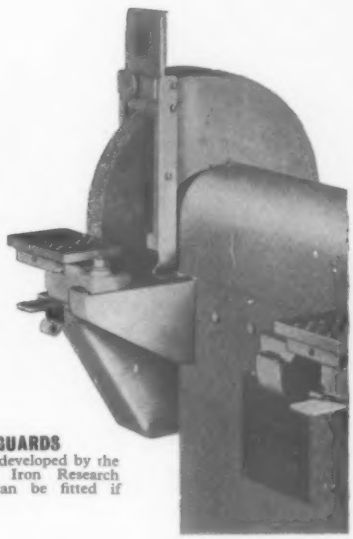

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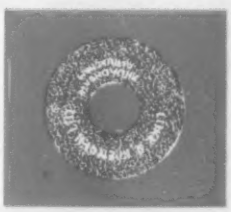

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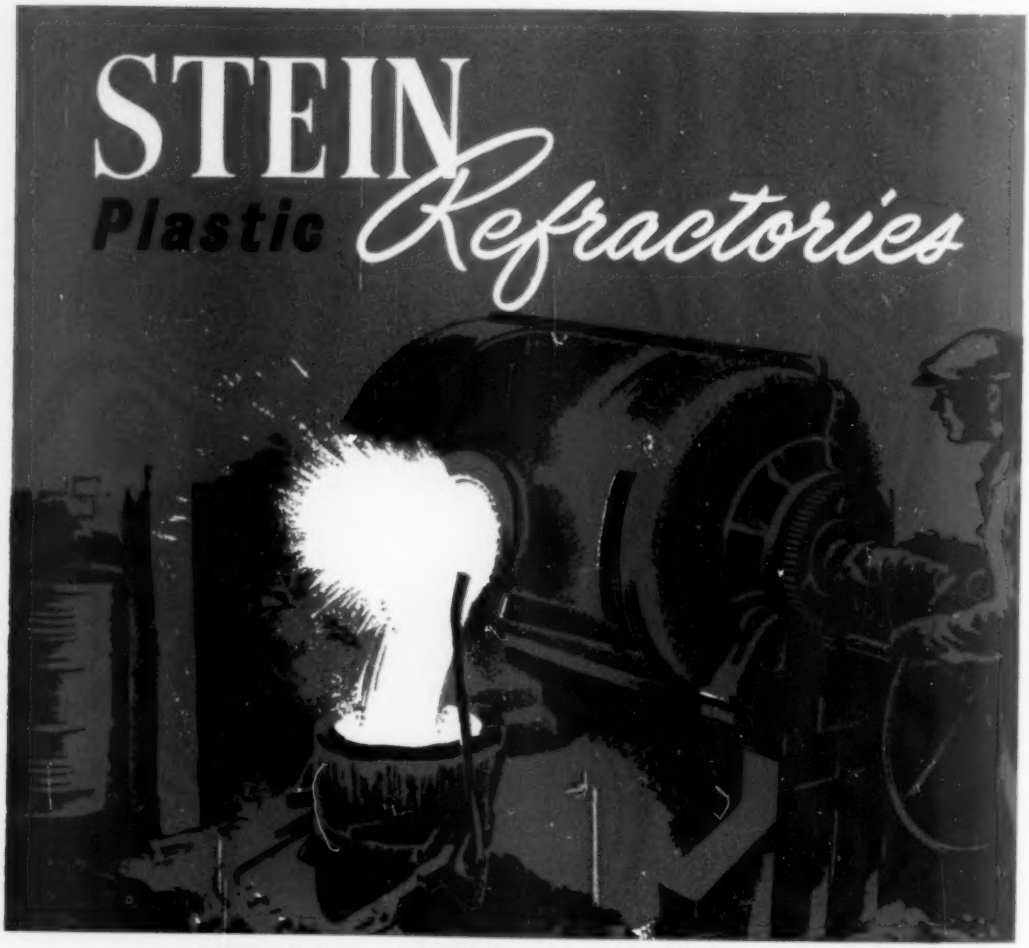

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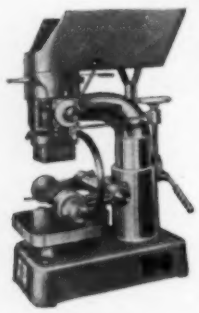

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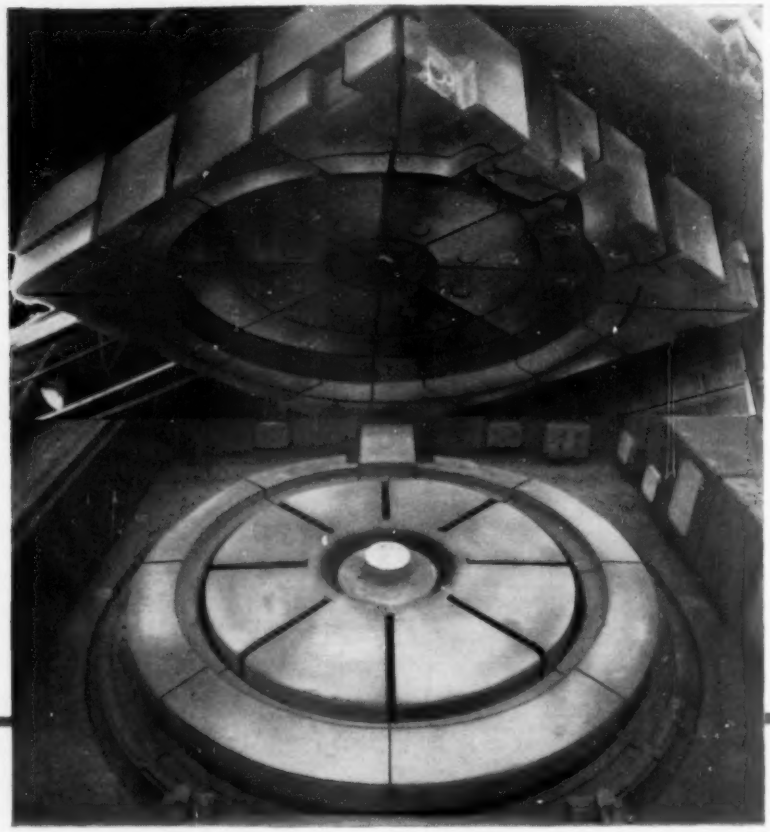

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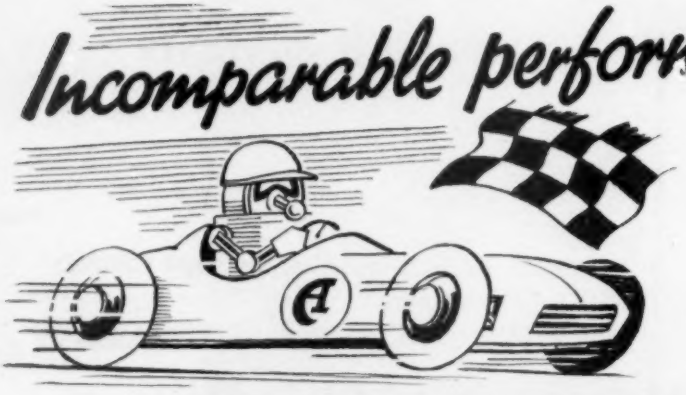
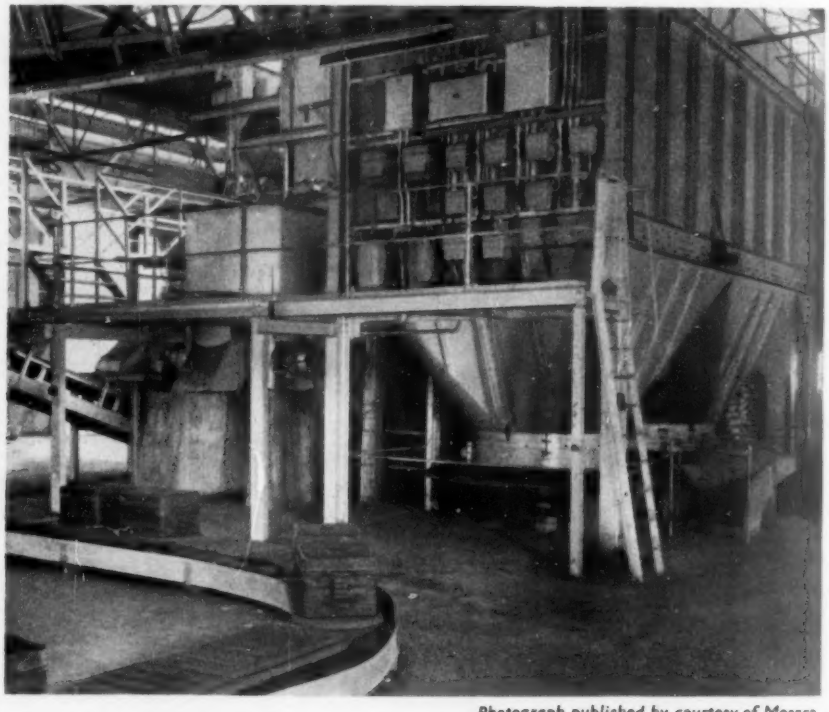


Photograph shows :

Two large storage hoppers with rotary table feeders, supplying reconditioned sand to belt conveyor ; to bucket loader (with bifurcated chute) which charges two 2F size August-Simpson Mix-Mullers. Batch capacity of each Mix-Muller is 2,000lbs. Note the August Mould Conveyor in foreground.



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FOUNDRY
TRADE JOURNAL
Vol. 111 December 28, 1961 No. 2351

1961—a Mixed Bag

Nineteen-sixty-one has not been exactly a vintage year for the UK foundry industry, yet there has been neither boom nor slump. The credit squeeze had a banal influence on some makers of consumer goods, such as heating and cooking appliances, whilst unofficial strikes injured the interests of firms catering for the automobile industry. This, of course, adversely affected not only iron, but also the light-alloy and die-casting sections of our industry. Bronze and brass founders have also suffered from decreased demand, but the October figures showed a sharp recovery. With steelfounders, business has been better than in 1960. Here, the energetic forward-looking policies initiated both by the individual founders and their trade organization over the last decade have borne fruit. Theirs was indeed a difficult task, as a major market —that of the supply of armaments—has shrunk to relatively small proportions. No longer is the output of steel castings a barometer of military activity. Great progress has been registered in the production of precision investment castings—here, output statistics based on weight have less meaning than in other branches of founding.

A good measure of prospects for the foundry interests would be the money the industry spends each year in new plant. At the moment, no figures are available for measuring such activity, but steps have been proposed to remedy this state of affairs. It is known the equipment side has during the year received very large export orders; these help in no small measure to keep the industry alive to modern requirements. A large overseas business has been cultivated, too, by some of the master patternmakers, which has compensated somewhat for the decline in orders from the home automobile founders. Strange to relate, reports from the agencies of the Board of Trade but a few years ago as to the possibility of expanding the sale of patterns overseas was most disheartening, the conclusions all pointing to the need for a man-on-the-spot making last-minute alterations. However, since it is now the custom to include with a consignment of patterns, actual castings made from the equipment, the objection can be minimized. The important conference organized by the British Steel Castings Research Association in the Autumn did much to clarify exactly what the steelfounders needed in the way of plant and how far these requirements could be met, especially if joint research were undertaken.

During the year, a great foundry technical Congress was held in Vienna and its undoubted success was due to the organizing secretary, Dr. Sigut. A small feature which apparently went unnoticed by many of the 1,500, or so, delegates was that for the first time in history of the foundry industry, the postal authorities provided a special cancellation on mail emanating from Congress headquarters. Other noteworthy events of the year were the Cheltenham Conference of the Institute of British Foundrymen, that in Florence for precision investment casters, the golden jubilee celebrations of the French and Belgian foundry technical associations, and participation of the Italians in the annual meeting of the National Society of Master Patternmakers. With the proviso that there are no major labour disputes in industry, founders should be able to look forward with confidence to some slight improvement in 1962.

Correspondence

To the Editor of the FOUNDRY TRADE JOURNAL

ANCIENT CANNON FOUNDRY

SIR,—I was interested to read the article in the FOUNDRY TRADE JOURNAL of December 14, entitled "Ancient Cannon Foundry" by T. R. Harris. To give more details about the "young man from Switzerland" mentioned in the article, I enclose a copy of the relevant part of the "Dictionary of National Biography" which was sent to me a year or two ago by a friend of mine.

Andrew Schalch, 1692-1776, was a master founder and was born at Schaffhausen in Switzerland. After being employed in the cannon foundry at Douay he came to England and in August, 1716, he was engaged to build the furnaces and provide the utensils for the new brass foundry at the Warren (later the Arsenal) Woolwich. Up to that time it had been used as a depot for stores, and cannon had been proved there but not manufactured. The only place for casting ordnance in England was Bagley's private foundry in Moorfields, where Whitfield's Tabernacle afterwards stood. A number of people assembled there on May 10, 1716, to see some of the French guns taken by the first Duke of Marlborough recast as English pieces, and an explosion occurred by which 17 persons were killed and others injured. It was in consequence of this disastrous accident that a government foundry was decided on.

The story has been repeated that Schalch, a young and unknown man, predicted the explosion, having noticed the dampness of the moulds; and after it had taken place he was advertised for and that the selection of a site for the new foundry was left to him. He has, therefore, been considered as the father of the Arsenal. But the story is unauthenticated and no such advertisement has been traced.

On the contrary one has been found (July 10, 1716) inviting competent men to offer themselves, after the site had been chosen and the buildings begun. A good report of Schalch's capacity having been obtained through the British Minister in Brussels, his appointment was confirmed in October; his pay was fixed at £5 per day.

He remained master founder for 60 years and acquired much wealth and a great reputation. In Flemming's Soldat Allemand (1726) the excellence of the British brass pieces is specially mentioned. It is said that Schalch would never suffer the furnaces to be opened till the workmen and spectators had joined him in prayer. Schalch died at the age of 84 and was buried in Woolwich Churchyard.

The Bagley mentioned was one of a line of bell founders who mostly had their foundry at Chacombe, near Banbury. The Bagley who was killed was Matthew Bagley II. The Bagley family was bell-founding from 1631 until 1782.—Yours, etc.

PAUL TAYLOR.

The Bell Foundry,
Loughborough.

TWO SUBSTANTIAL ORDERS from overseas received by W. J. Jenkins & Company, Limited, engineers, Retford, Nottinghamshire, are for an extension to a coal-carbonizing plant for the municipality of Port Elizabeth, South Africa, and valued at £50,000, and two asphalt batch-mixing plants for Spain, worth £40,000.

British Standards Institution

Revised codes of practice announced in the December issue of *BSI News* includes CP 332,301:1961, Domestic space-heating by means of independent gas appliances, price 10s. The revised code takes into account advances made in the design and range of space-heating appliances and developments in installation technique since the initial publication in 1947. It gives comprehensive guidance on the selection and installation of radiant or convector fires to provide degrees of thermal comfort according to calculated standards, by full heating, background or supplementary heating. Tables are provided for calculation purposes. In an appendix the methods of calculating heat requirements are explained, and a method of fitting gas fires to existing brick chimneys is discussed as well as the use of precast flue blocks for hearth and panel fires, and conventional flue systems for tall buildings.

Amendment No. 3 has been issued to BS 1010:1959, draw-off taps and stop valves for water services (reference number when ordering, PD4367); Amendment No. 1 to BS 1017: Part 2:1960, sampling of Coke (PD4366), and amendment No. 1 to BS 1902:1952, methods of testing refractory materials (PD4342). It is also announced in this issue that reprints are now available of BS 1218:1946, sluice valves for waterworks purposes (5s.), and BS 2902:1957, higher tensile steel chain slings and rings, links alternative to rings, egg link and intermediate links (10s.). New work started includes that on a glossary of terms relating to materials handling; and letters, symbols, signs and abbreviations (revision of BS 1991, Part 1). Amongst draft standards circulated for comment appears AB(MEE)7683, tensile testing of metals (revision of BS 18:1956), and AB(SFE)8034, code for the sampling and analysis of flue gases (revision of BS 1756: Parts 1 and 2), copies of both these draft standards cost 3s. 6d. each. All the standards mentioned are available from the sales branch of the Institution at 2, Park Street, London, W.1.

* * * *

It is interesting to record that in this issue of *BSI News* there is an account of works visits made by the new ISO committee to discuss the unification of crane standards. It so happens that both the visits, illustrated pictorially, were to foundries. The first picture shows delegates watching a mobile crane climb in a one-in-five gradient at the Letchworth works of K & L Steelfounders & Engineers, Limited, and in the second picture some of the visitors are examining a dockside hoisting unit at Stothert & Pitt, Limited, Bath.

THE BRITISH RED CROSS SOCIETY, 14/15, Grosvenor Crescent, London, S.W.1, announce that Smith & Nephew, Limited, has donated a silver trophy for competition among small factories (those employing fewer than 50 people) in England and Wales, to encourage both management and workpeople to take a greater interest in first-aid. The trophy will be presented each year to the factory which, in the opinion of the judges, achieves the highest proportion of qualified first-aid people on its staff and has provided the best first-aid arrangements. Entry forms are available from local units of the British Red Cross or from the public relations officer, Smith & Nephew, Limited, Bessemer Road, Welwyn Garden City, Herts. Completed entry forms for the 1962 award must be returned by September 30, 1962, and entries for the first award will be acceptable during all the first nine months of 1962.

Estimating Feeder Dimensions for Sand Castings

*By J. Weston L.I.M. and V. Kondic, B.Sc., Ph.D.**

A method for estimating feeder dimensions in sand castings is described. This is based on determining experimentally the solidification times for various types of feeders and independently for castings and using the graphs obtained therefrom for dimensioning feeders. The method is applied to estimate feeder dimensions for a number of sections cast in several non-ferrous alloys. The results, although confirming the validity of the basic principle proposed, require further work in order to confirm the usefulness of the method for general application.

Feeding of castings and designing feeder-heads to achieve this purpose is as old a problem as that of making castings. In the first instance a feeder is necessary if the casting is to reproduce adequately the shape of the mould cavity, without shrinkage phenomena at the surfaces of castings, a requirement which is essential in the production of most classes of castings. Secondly, for many classes of castings feeders are essential to minimize or avoid shrinkage cavities appearing internally. On the other hand there exists certain types of alloys which do not require much feeding and certain designs of castings where feeding is not essential, but by and large, the solution of the feeding problem is an integral part of both craft and science of metal founding.

Practice

In current foundry practice two distinct approaches to the solution of feeding problems are being used. By far the most-widely used method is that based on direct practical experience. For different compositions of alloys, classes and designs of castings, and for different methods of moulding there exists a wealth of practical data concerning feeders. This can be found in foundry records and technical publications, or equally frequently only as the unrecorded experience of skilled foundrymen. Most of such data is based on sound metallurgical and engineering observations which, when properly used, can solve most, if not all, of the practical problems of feeding castings. Accordingly, in many foundries today feeders are designed either on the basis of shrewd " guessing " or by using previously obtained data which are systematically correlated and developed into graphs or formulæ. Frequently a combination of these two methods is used.

Calculation

A further general method of obtaining feeder dimensions which is at present used in the sand foundry industry is that of calculation. This is fundamentally based on a definite scientific principle which has been developed theoretically or empirically into formulæ or graphs for obtaining feeder dimensions. The principle which has been used most widely in the past is that of relative solidification times. In order to function properly, a feeding-head must solidify after the casting, and the main question to be solved in practice is that of relating solidification times of the feeder and the casting to other quantities readily obtainable. It was Chvorinoff[1] who first pointed out that solidification time can be related to the geometry of a casting which can be most simply expressed in terms of its volume-to-surface ratio. Many attempts have been made both on theoretical bases as recently reviewed by Patterson and Koppe[2], and on experimental bases as discussed by Bishop[3], to improve on as well as to clarify various issues originating in the application of Chvorinoff's principle to feeder calculation. One school of thought, *viz.*, that of Pellini *et al*[4], has developed the concept of the " casting shape factor " which can be related to the solidification time, and which, when supplemented by experimental data, can be used for feeder calculation. The other school of thought as represented by Patterson and Koppe[2] points out that geometrical factors alone cannot satisfactorily solve the problem, and therefore they introduce other variables such as feeding volumes and casting and feeder design factors. Basically both of the above calculation methods of feeder dimensioning use the geometry of the casting as the starting point, but develop different relationships in the end, depending on the final accuracy aimed at and the general applicability of the proposed formulæ to sand-foundry practice. The extent to which these methods of feeder calculation have already, or will in future, replace the currently and preponderantly used empirical methods, is as yet difficult to estimate. There is little doubt however that feeder dimensions can be obtained by calculation for some alloys and for a limited number of feeder and casting designs for which sufficient experimental data necessary for such calculation have been made available.

* Mr. Weston is research assistant in the chemical engineering department, and Dr. Kondic is senior lecturer in founding at the University of Birmingham.

Estimating Feeder Dimensions for Sand Castings

Solidification Times

The method of feeder dimensioning which is proposed in this paper is basically different from the two calculation methods outlined above. Instead of using geometry of the casting as the basic quantity related to the solidification time, it is proposed to use solidification time itself as measured directly by taking appropriate cooling curves. In this sense the proposed method is, at this stage of its development, essentially based on experimentally obtained data, which are however, both readily obtainable and directly applicable.

Limiting Factors

Any method of feeder dimensioning must take certain basic metallurgical and foundry factors into consideration: (a) Feeding characteristics and, therefore, feeder requirements are alloy dependent; this includes the quantity of liquid and the solidification volume contractions as well as the way in which solidification contraction occurs in relation to the temperatures of solidification (freezing range), and in relation to the freezing mechanism (liquid and solid distribution or pasty zone depth). Accordingly, identical feeding heads will not feed equally-well identical castings if these are made in alloys of different freezing characteristics; (*b*) feeders have to be designed in such a way to satisfy moulding, gating and fettling requirements of castings, they must be positioned relative to the casting (top, side, open, blind) to promote most advantageous temperature gradients in castings—possibly combined with application of chills—and at the same time to avoid cooling, which leads to either distortion or stresses, their number must be such that they feed the whole of the casting adequately and at an optimum economy of foundry work as well as of metal. These foundry variables cannot be used as bases for feeder calculation, but such calculation must take note of the above factors in the final dimensioning of feeders, otherwise they will remain only an academic exercise; (*c*) sand moulding presents the feeding problem in its most general case but even in this class of castings alone, there are a number of specific feeder variables, for example, the geometry of the feeder itself or feeder-shape factor and also cooling characteristics of the material surrounding the feeder (plaster, sand, insulating materials, exothermic covers and sleeves). Feeder calculations must therefore consider specific feeder designs and materials; (*d*) Feeder problems encountered in other than sand castings, for example, with permanent, ceramic, shell and plaster moulds, are similar to the sand feeding problems, but they differ in certain basic as well as technical details which must be taken into account in feeder calculations in such cases.

On the bases of the above considerations it is clear that the starting point of feeder dimensioning must be that of the correct interpretation of all the founding and economic factors which are encountered with a particular casting design and methods of making castings. Location of feeders, their basic design and even their number can be estimated on the bases of these preliminary deliberations. The next step is that of selection of optimum feeder geometry and material to be used, whilst also paying attention to the alloy characteristics. Finally, dimensions of feeders and their correct number are obtained either by empirical methods or by calculations or graphs, as previously discussed.

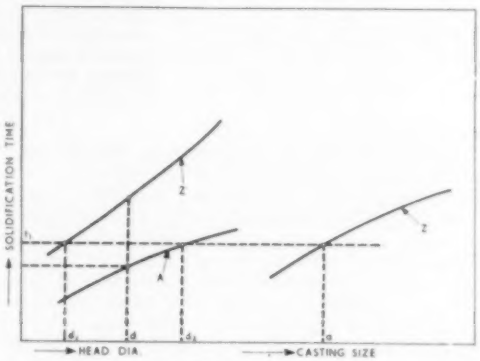

FIG. 1.—*Relationship of solidification times of feeders and casting, obtained experimentally.*
A = start of solidification, Z = end of solidification.

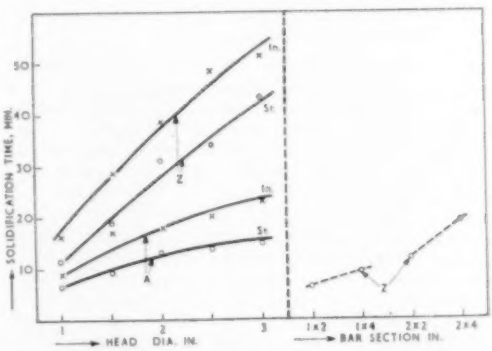

FIG. 2.—*Solidification time of heads and bars in LM6 aluminium alloy.*
A = start of solidification, Z = end of solidification, In. = insulated, and St. = standard.

It is clear that a completely general solution of the feeding problem for sand castings in terms of a single equation is hardly practicable, there are too many castings and feeding methods and designs to make such an equation a feasible proposition. On the other hand, a general equation can be formulated for some specific cases on the principle that solidification time of a feeder should

be greater than that of the section which is to be fed, and then the quantities involved may be related to the geometry of the casting and of the feeder. Following this line of approach for selected alloys and materials, the necessary constants to make such equations directly applicable are obtained experimentally, as shown for example by Patterson and Koppe[2] and Bishop.[3] However, a number of assumptions have still to be made in this approach and one of the most formidable difficulties is that of taking into account all the possible shapes that are encountered in the design of castings and to assess correctly various shape interrelationships that can arise. The method of feeder dimensioning proposed in this paper avoids complications due to the casting geometry and makes use of solidification times obtained directly and experimentally.

Proposed Method

The principle of the proposed method of feeder dimensioning can be best explained by means of a graph, Fig. 1. Solidification times of a series of feeding heads varying in size but of a given shape, in a given material and poured in a given alloy are obtained experimentally. From the results obtained, graphs showing the start as well as the end of solidification in relation to the feeder diameter are drawn. Similarly, total solidification time of selected casting sections which are to be fed are obtained experimentally. Feeder dimensions to feed a given casting section can be obtained on the bases of the following propositions. A section "a" which ends solidification at time "t" cannot be fed with a feeder d_1 which ends solidifying at the same time t_1. But a feeder of diameter d_2 which is just starting to solidify after time t_1, should fully feed this section. Alternatively a feeder of diameter d partly solidified at the time t may be satisfactory. The object of this paper was to test whether this approach could be used for estimating feeders in sand castings.

Experimental Work

The experiments described were carried out in three stages. First, solidification times for selected series of feeders were obtained for a given alloy. Secondly, solidification times of a small number of simple-shaped castings were obtained with the same alloy. Finally, from the data obtained, feeder dimensions were determined which would be expected to feed the casting shapes used. Similar experiments were then repeated for a number of light and copper-base alloys of different solidification characteristics. The aloys used were all of commercial and standard composition, and unless otherwise stated poured in all cases at 100 deg. C. superheat.

Feeders

The selection of feeder heads involves several problems as already discussed. For the purpose of this work exothermic sleeves of various diameters and in all cases having height h equal to internal diameter d and 0.5-in. wall thickness were chosen. These were moulded in Congleton-base sand (3.5 per cent. bentonite and 3.5 per cent. clay) medium rammed, and the mould carrying the feeder placed on an insulating brick prior to pouring. After pouring, the top of the feeder was covered with exothermic powder and the solidification times recorded using 28 gauge cromel/alumel thermocouples and a high-speed temperature recorder. The accuracy of the temperature measurement was ± 5 deg. C. and of time recorded ± 10 sec. Solidification times obtained for various feeder dimensions and in different alloys are given in graphs 2, 3, 4 and 5. These graphs show start and end of solidification curves for both standard exothermic feeders embedded in moulding sand and also "insulated" feeders. In this latter case feeders were wrapped in corrugated paper which on burning left an insulating air gap between the feeder and the moulding sand. The graphs show the general usefulness of insulating the head as well as the fact that the time of start of solidification increases relatively slowly relative to head diameter, in comparison with the time of the end of solidification which increases relatively more rapidly.

Solidification Time of Cast Bars

Four rectangular shapes were used, *viz.*, 1 by 2, 1 by 4, 2 by 2 and 2 by 4 in., all 8 in. long. These bars were cast flat, moulded in medium rammed Congleton sand, using the same alloys and pouring temperatures as with the feeders. Ends of solidification times for these bars are shown also in graphs 2, 3, 4 and 5. As the dimensions of the bars used were selected arbitrarily and only few in number, no attempt was made to draw general solidification time graphs for cast bars especially as these are not required in the subsequent discussion.

Feeding and Examination of Cast Bars

Before applying solidification time data for feeder dimensioning, two questions have to be considered. The first is that of feeder positioning on the casting. Research data available dealing with this problem suggest that end-feeder would be most suitable for feeding the cast shapes used in this work. This type of feeding was therefore selected, and feeders were placed at the end of bars and on a semi-circular extension. The gating was similar for all alloys used, the ingate of suitable design being joined to the base of the feeder.

The second question is that of selecting a datum line for solidification time of a feeder relatively to that of the casting. Solidification times of feeders and bars used in these experiments were obtained separately, whilst in fact during feeding, a head loses a certain amount of metal to the casting to compensate for the liquid and solidification volumetric shrinkage of the casting. This leads consequently to a shorter solidification time of the feed when joined to the casting than that obtained when the feeder solidifies separately. In order to compensate for this, a feeder could be selected which has the start-of-solidification time equal to the end-of-solidification time of the cast-

ing, and then its volume (height) increased by the amount of volumetric shrinkage of the casting. In this instance, the casting is expected to be fully fed as the feeder only starts solidification at the time the casting is ending its solidification. In fact, the feeder being an integral part of the casting, will delay the cooling of the adjacent section of the casting and similarly the casting will tend to take some of the heat of the feeder. These interchange-of-heat effects will vary from one casting design to another and could be determined only experimentally.

For the purpose of this work feeders were selected on the bases that start of solidification time as shown in graphs 2, 3, 4 and 5 is equal or very nearly equal to the end of solidification time of the bar which is to be fed. No other assumption or correction was used and the question whether this leads to under-dimensioning or over-dimensioning of feeders was left to be decided on the bases of the results obtained.

Type, standard (s) or insulated (i), and dimensions of feeder-heads used, mechanical properties of edge (e) and centre (c) of 1 by 1 in. test-bars cut from the cast bars, as well as their densities are given in Table 1, for the alloys used. In addition, feeder yield is given, expressed as a percentage of solidified-feeders to the volume of liquid metal in the feeder after pouring.

Comment

It is proposed to discuss three different aspects of this work separately—solidification times, mechanical properties of alloys, and dimensioning of feeder-heads.

Solidification Times

An interesting feature revealed in Figs. 2 to 5 is the divergence of start and end of solidification curves with an increasing feeder diameter. For each increment of the diameter of the feeder the start of solidification in the feeder is delayed but only relatively little in comparison to the end of solidification time. The value of insulating the feeder sleeve is also demonstrated in the graphs.

The main question arising from Figs. 2 to 5 is whether the value of the start of solidification time in feeders, or some other value, should be taken as the reference time for feeder dimensioning. Quantitative arguments relating to this question are discussed subsequently, but some general points can be made at this stage. Clearly, if the metal in the feeder remains liquid long after the casting has solidified, the feeder is too large or over-dimensioned, and conversely, if the feeder and casting solidification times are equal, the feeder is inadequate. The maximum required feeder diameter can therefore be obtained with reference to the start of solidification time of the metal in the feeder. On the other hand, with some partial solidification in the feeder at the time the casting is completing its solidification, it could be still possible for a casting to be fully fed. From the preliminary results obtained in this work it appears that such an assumption of partial solidification in the feeder can be allowed more readily with short—rather than long—freezing-range alloys and with larger rather than small diameter feeder. The more exact value of the extent to which possible partial solidification in feeders is compatible with successful feeding remains to be determined experimentally.

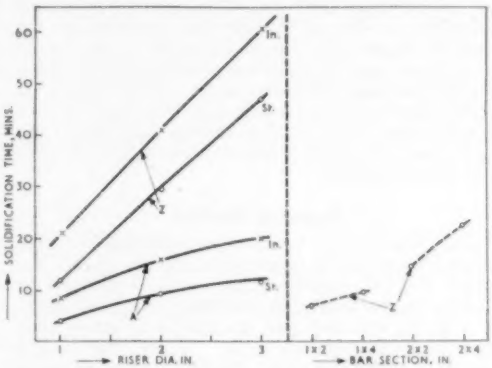

FIG. 3.—*Solidification time of heads and bars in LM4 aluminium alloy.*

A = start of solidification, Z = end of solidification, In. = insulated, and St. = standard. (In this and other illustrations "riser" is used synonymously with "feeder.")

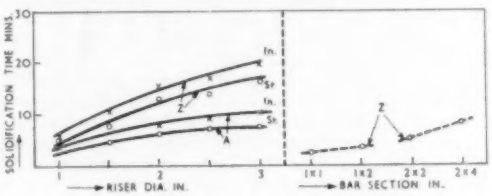

FIG. 4.—*Solidification time of heads and bars in aluminium-bronze.*

A = start of solidification, Z = end of solidification, In. = insulated, and St. = standard.

In this work, solidification times both of feeders and of cast bars were obtained by direct experiment. It is clearly possible to make use of basic laws of heat transfer to extrapolate the data obtained for other dimensions of feeders and bars. The amount of experimental work to obtain adequate data for solidification times of feeders of different designs and in different materials would be therefore necessarily limited. Castings vary much more in design and shape but even in this case adequate data for feeder dimensioning could be obtained from a limited number of experiments. Another question concerning the value of solidification time is whether this quantity for feeders and castings should be obtained by separate experiments or simultaneously with the feeder being attached to the casting which is being fed. Whilst there are

TABLE 1.—*Relationship of Mechanical Properties of Test-bars fed with different types of Feeders (the LM series are aluminium alloys).*

Alloy.	Bar section.	Feeder.		Test-bar.			Density.	Feeder yield.	Remarks.
		Type.	Size depth by height in.	Edge—E Centre—C	Ultimate tensile strength.	Per cent. elongation.			
LM6. per cent. Si 11.6	2 by 1	i	1 by 1	E	11.6	11	2.66	10	Degassed and modified (3 per cent. K, N salt) at 78 deg. C.
	4 by 1	s	1.5 by 1.5	E	11.2	15	2.66	12	
				C	11.4	11			
Fe 0.63	2 by 2	i	1.5 by 1.5	E	10.52	10	2.66	14	
Mn 0.13	4 by 2	i	2.5 by 2.5	E	10.5	5	2.66	18	
				C	8.72	3			
LM4 melt 1 per cent. Si 4.75	2 by 1	i	1 by 1	E	9	2	2.70	30	Degassed with N_2 for 10 min. at 1 litre per min.
	4 by 1	s	1.5 by 1.5	E	8.32	1	2.69	35	
				C	7.84	2			
Cu 3.23	2 by 2	i	1.5 by 1.5	E	8.08	1.5	2.65	46	
Fe 0.66	4 by 2	i	3 by 3	E	8	2	2.63	52	
Mn 0.57 Mg 0.09 Ti 0.13				C	7.6	1			
LM4 melt 2.	2 by 1	i	1.5 by 1.5	E	10.08	2	2.78	28	As *LM4* melt 1.
	4 by 1	i	1.5 by 2	E	9.32	2	2.76	30	
				C	9.08	1.5			
	2 by 2	i	2 by 3	E	9.04	2	2.77	38	
	4 by 2	i	4 by 4.5	E	8.78	1.5	2.75	40	
				C	8.16	2			
Al-bronze per cent. Al 7.20	2 by 1	i	1 by 1	E	23.2	43	7.85	12	Ingot charge, no treatment.
	4 by 1	s	1.5 by 1.5	E	24.5	32	7.80	14	
Fe 1.29				C	24.4	34			
	2 by 2	s	2 by 2	E	21.2	25	7.83	15	
	4 by 2	i	3 by 3	E	25.4	37	7.79	17	
				C	24.8	32			
Mn-Brass per cent. Sn 0.28	2 by 1	i	1 by 1	E	30.7	20	8.27	13	Ingot charge, no treatment.
	4 by 1	s	1.5 by 1.5	E	32.1	21	8.22	15	
Fe 0.51				C	30.1	19			
Al 0.80	2 by 2	s	2 by 2	E	30.8	19	8.23	15	
Mn 0.86	4 by 2	i	2 by 3	E	31.3	21	8.26	20	
Ni 0.04				C	29.3	18			
Leaded Gunmetal per cent. melt 1.	2 by 1	i	1 by 1	E	8	5	8.60	30	Melted under charcoal, degassed with N_2 for 5 min. at 1 litre per min. Deoxidized with 0.05P.
	4 by 1	i	1.5 by 1.5	E	7.12	6	8.59	32	
				C	5.12	4			
Sn 5.10	2 by 2	i	2 by 2	E	7.52	5	8.59	42	
Pb 5.27	4 by 2	i	3 by 3	E	7.84	6	8.58	50	
Zn 4.20				C	7.92	7			
Leaded Gunmetal melt 2.	2 by 1	i	1.5 by 2	E	12.67	15	8.70	28	As melt 1 of the same alloy.
	4 by 1	i	2 by 2	E	12.60	20	8.69	30	
				C	10.5	14			
	2 by 2	i	2.5 by 2.5	E	12.40	16	8.69	38	
	4 by 2	i	3 by 4	E	12.36	18	8.68	4.5	
				C	10.4	12			

some advantages for choosing either way, it is clearly preferable at the present stage of development of proposed method of feeder dimensioning to obtain solidification times separately. The subsequent experimental work will show in due course whether any definite advantages would be gained by obtaining solidification times jointly rather than separately.

Mechanical Properties

The term feeding for a casting is a relative term. Castings can be fully fed, implying zero porosity in the solid casting, or partly fed, implying porosity varying from 0 to 5 per cent. Similarly, the porosity could be uniformly dispersed or concentrated in certain parts of the casting. The choice and the extent of feeding is determined by moulding and casting considerations and is related to the subsequent application of castings in industry. Measuring the extent of feeding could be either direct, for example density measurement, or indirect by measuring a property related to the density, for example mechanical properties. These two simple methods of measuring the extent of feeding were selected in this work, but other methods, some more and some less accurate, could have been used satisfactorily, for example, radiography, micro-radiography, density distribution and others.

The results given in Table 1 show that for most alloys and bar sizes selected the extent of overall porosity as compared with maximum density in wrought alloys of the same composition, is of the order of 0.5 to 1 per cent. Previous studies of feeding sand castings[5] have shown that greater degree of soundness than these figures are obtainable in sand castings but require special casting techniques.

One interesting feature of soundness and of mechanical properties of castings is the change in these properties with an increasing cross-section size. Whilst the range of cross-section size studied in this work has not been very wide, it is interesting to note in Table 1 that variations in soundness and mechanical properties obtained are quite small. This indicates that the bars used have been equally well fed in all cases. In two instances, with LM4 alloy and with leaded gunmetals properties obtained with the first melt were below the expected standards. Clearly in these two cases feeders selected were not adequate. Consequently feeders were enlarged as discussed in the subsequent paragraph and the tests repeated, giving more satisfactory results. The reasons for these particular observations are discussed in the next section.

Dimensioning Feeders

The general object of the work described in this paper was to provide experimental data to test a method for dimensioning feeders in sand castings. This object has been largely achieved in so far as to show that the method suggested was successful in obtaining uniformly fed cast bars.

General Application

What remains to be discussed is a series of questions related to the basic issues involved for a general application of the proposed method.

Datum Time

Should a feeder be fully liquid or partly solid (and to what extent) at the time when the casting has just solidified? The former of the two assumptions was made in this work. The results show that this assumption gave correct anwer for predicting feeders for alloys of short freezing range, but was not correct for alloys of long freezing range. This is no doubt due to the fact that the assumption used is based on solidification times of feeders solidified separately, and does not take into account loss of metal from the feeders to the casting during feeding. This is clearly demonstrated in the feeder yield values shown in Table 1. This implies that in fact the feeders used could have partly solidified during feeding, but they were still successful in feeding short range freezing alloys. This could be explained as being due

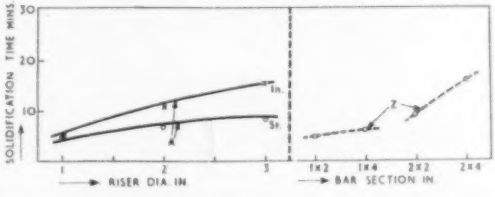

FIG. 5.—*Solidification time of heads and castings in leaded gunmetal.*

A = start of solidification, Z = end of solidification, In. = insulated, and St. = standard.

to a narrow width of the pasty zone during solidification obtained with these alloys, leaving the central liquid in the feeds to feed castings adequately. On the other hand, these feeders presumably partly solidified, were not adequate for long freezing range alloys solidifying through a pasty mechanism which extends across the whole casting cross-section. For this reason feeders were enlarged for alloys LM4 and the leaded-bronze, the additional volume used being equal to the volumetric shrinkage of the cast bar, resulting in better feeding as shown in Table 1. The correct amount of enlargement required above that predicted from the graph 3 and 5, for the long freezing range alloys remains one of the points for further study.

Type of Feeder

Any general approach to the problem of dimensioning feeder must take into account the fact that there are several possible feeder designs, materials and methods of placing feeders on castings as dictated by casting design, moulding, production and cost requirements. In the present work only one typical feeder design (cylinder), one material (exothermic sleeve) and one typical

casting shape (bars of various cross-section) were used. The experimental method used was close to that which is defined as "side feeding" in foundry practice. Consequently the data obtained would apply best to the conditions of side feeding. There does not appear however an obvious reason why other feeder materials, feeder designs or cast shapes would invalidate the basic approach to feeder dimensioning as outlined in this paper. Solidification times would be obtained experimentally for any combination of variables as required and the data used in the manner described. Clearly a certain amount of experimental work is required at this stage, but this would not be extensive to cover materials and shapes most widely used in a given foundry. Feeder dimensioning would be placed in this manner on a general, quantitative and direct basis which could be used directly on the foundry floor concerned.

Other Methods

The main feature of the proposed method of feeder dimensioning is the application of solidification graphs obtained by direct experiment. Other currently used methods of feeder calculation are based on the data obtained from surface and volume measurements of castings and feeders respectively. In these methods too, experimental work is required to obtain various types of constants before a particular equation or graph could be applied in practice. The main difference between the proposed and currently available methods of feeder calculation lies in the fact that the former is more direct and simpler in application, whilst the latter depend on a combined application of casting geometry and experimentally established constants for specific sets of alloys and castings conditions.

Conclusions

Sand castings have been and are likely to stay one of the most varied of metallurgical products: shapes, sizes, alloys, moulding methods are but a few of many other sources which led to this variety. There are on the other hand certain principles that underline most castings and one of these is feeding. This paper describes one approach toward obtaining feeder dimensions on a general basis which may serve both towards better understanding of cast metals as well as improvements in foundry practice.

Acknowledgments

Authors are indebted to Professor E. C. Rollason, Head of the Department of Industrial Metallurgy, for provision of laboratory facilities, general encouragement and to Foseco, Limited, for provision of feeder sleeves.

REFERENCES

1. Chvorinoff, N., *Giesserei*, 1940, **27**, 177.
2. Koppe, W. and Patterson, W., *Giesserei Techn. Wiss. Beihefte* 1960, (30), 1647.
3. Bishop, H. F., *Foundry*, 1960, **88** (8), 75.
4. Bishop, H. F., Myskovski, E. T. and Pellini, W. S., *Tr. Am. Found. Soc.* 1955, **63**, 271.
5. Roberts, W., Thesis, University of Birmingham, 1959.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 4s. 6d.).

861,566. Stauffer Chemical Company, 380, Madison Avenue, New York City, N.Y., USA.

The melting and casting of metals under vacuum to remove co-mixed or dissolved volatile matter. The invention provides for a casting process operable on a continuous basis for producing castings of devolatized metal at a lower cost than has been previously possible.

861,635. E. J. Schaefer, 400, East Spring Street, Bluffton, Indiana, USA.

Casting under vacuum using automatic processes. This inventor claims a method which includes the steps of *drawing* a flexible sleeve into tight engagement with the mould upon application of the vacuum to the interior of the sleeve; *removing* a seal from an opening permitting access to the cavity; and *drawing* molten metal by the vacuum through the opening into the mould cavity to fill it.

861,662/3. Herman Pneumatic Machine Company, Union Bank Building, Pittsburg, Penna., USA.

The utilization of a flask as a measuring container determining the volume of uncompacted mould-forming material introduced into the flask for formation of the mould, so that when the mould forming material is compacted a mould of desired size is made. This company has a co-patent No. **861,663** which claims improved means for retaining the mould-forming material in a flask or flasks, particularly in centrifugal-casting processes.

861,759. Die Casting Machine Tools, Limited, and Mr. A. B. Mills, River Works, 152, Green Lanes, Palmers Green, London, N.13.

The principal object of this invention for die-casting machines is an improved control system. (See also B.P. **811,873,** February 11, 1960, FOUNDRY TRADE JOURNAL.)

861,775. Sterling Foundry Specialties, Limited, Sterling Works, Bedford.

Foundry moulding boxes. A method of making these is claimed by which the walls of the moulding box are formed by welding to the upper and/or lower edges of a strip of weldable metal (for example, mild steel), a bar having on one side a relatively flat, wide face and on the opposite side thereto also a recess or corner for accommodating the edge of the said strip. This bar is also claimed to have a corner on the inner side of the moulding box walls chamfered in order to permit removal of sand.

861,830. Mannesmann A.G., Mannesmannufer 1b, Düsseldorf, Germany.

Improvements in continuous-casting apparatus which are claimed to prevent hollow castings from breaking.

858,899. S.A. Fonderies Chokier, Louvrouil (Nord), France.

An installation for the preparation, handling and transporting of sand moulds for metal casting.

PRODUCTION CHEMICALS (ROCHDALE) LIMITED, have vacated Victoria Buildings, 32 Deansgate, Manchester, 3, and their address is now "Speakers House," 39 Deansgate, Manchester, 3 (telephone: Blackfriars 3396 and 6302).

Ancient Bells and their Founders

By Capt. A. Humphrey Fenn, T.D., F.R.G.S.

Bells have always held an important place in Christian worship in our Land. Sometimes their music has thundered out in resonant majesty as on some great day in the calendar, at Christmastide and for ringing in the New Year, or for some other national event, warning, celebration or thanksgiving. Of such bells as these was the "Great Bell" of Storrington, Sussex, which rang for 30 min. each night from All Saints' Day to the Feast of the Purification (February 2). St. Mary's, Ely, had a "horse-bell," so called because it was used to rouse horsemen in the early morning. At some places, at harvest-tide, the bells were rung during the hours of gleaning. The ring of bells at St. Peter, Mancroft, Norwich, reputed to be one of the finest in the country, rang out by order of Queen Elizabeth I to celebrate the "tryumphing day over the Spanyards." They rang again in 1657 for Cromwell on his being appointed Lord Protector, and again in 1660, on the restoration of the monarchy.

Formerly, the bells of many churches rang the curfew; one of the very few still ringing it is "Tom" of Christ Church, Oxford. Formerly, also, they would ring on November 5 for "Gunpowder, Treason and Plot."* At Waltham, Lincolnshire, it is recorded: "1745, November 5th, paid the ringers 3s."; and at Lowick, Northants, "Spent for the Ringers that did ring 5th of November, 1708, 2s."

The bells of many churches ring out a hymn-tune or popular song of other days. Or maybe a single bell, its tone no less sweet in isolation, may call across the quiet English fields, the "single bell beneath the hill" of Tennyson's "In Memoriam."

Marks of Origin

In the priceless heritage of architectural gems which are to be found in the churches throughout the country are included the works of medieval craftsmen in stone, metal and wood, and of the painters on walls and glass. Most of these artists have left little or no clue to their identity. Seldom are there initials, far less-often, a signature. Not so with those wizards of metal, founders who cast the bells. Those master craftsmen seem to have taken sheer delight in leaving permanent record of their work. Moreover, they seemed to have wished to mix with the metal in the melting-pot some of their own personality, their sentiments and quite often, their sense of humour. From the earliest days of English foundries, the owners have had some sign, and later, a trade-mark somewhat similar in form and function to the "hall-marks" of the silversmiths. Thus Thomas Potter, who cast bells in Norwich in the early years of the 14th century, took for his mark a three-legged pot! Richard Brasyer, who succeeded him about 1450, placed a crown on his bells, a mark still used by bellfounders to-day. To these marks he added the arms of the city of Norwich. A bell in Holy Trinity, Bungay, Suffolk, has on it three shields with Brasyer's marking "on a field sprigged, three bells and a ducal coronet" and the inscription: "*Fac Margareta Nobis Hac Munera*"; and on bells at Trimingham and Ketteringham, Norfolk, appear the inscription: "*Ricardus Baxter Brasyer de Norwica fecit me*, 1450."

Foundry trade-marks, however, are not often seen on bells cast earlier than during the 15th century. However, the origin and date of early bells can usually be determined by the lettering, including the "black letters" and the crosses and the floriated stops. The trade-mark of John Danyell of London (1430-1460) was his shield, carrying the arms of England and France, with crosses and his initials "J. D." All have inscriptions in Latin. St. Botolph's, Cambridge, has a complete and untouched ring of Danyell's bells (1460). All four have Danyell's marking, small and capital "black letters," floriated stops, and all except the treble have his shield with the Arms of England and France. The second and the treble have one of his crosses and the latter has his initials. These bells have the inscriptions: Treble "*Sancte Apolina Ora Pro Nobis. J. D.*"; second: "*Sancte Andrea Ora Pro Nobis*"; third: "*Sancte Margareta Ora Pro Nobis*," and fourth: "*Nomen Magdalena Campana Gerit Melodia.*" There are only three towers in England besides St. Botolph's, Cambridge, which have four pre-Reformation bells made by the same founder at the same period. One London church, St. Bartholomew the Great, Smithfield, has five bells reputed to have been cast by Thomas Bullesdon, *circa* 1500. This founder probably worked with Danyell.

Ancient Craftsmen

As has already been stated, bellfounders differed from their contemporary workers in other crafts. Which is all the more remarkable when it is borne in mind that unlike other features in church architecture and ornament, the bells were destined to remain high, aloof, heard but unseen; like Echo, only a voice. Stowed away in some near-inaccessible upper-chamber of their own, festooned with cobwebs and visited almost exclusively by the bats which entered and left by the "sound-holes"—thereby originating the rather uncomplimentary expression "bats in the belfry"—they were seldom seen except by workmen or some stray student or admirer. Far the majority of those who enter the church either to worship or to view, pass by knowing and seemingly caring little for their story. The makers of bells took infinite pride in their work and gave to their creations a personal, almost a human, touch which has endured through the

* The service for November 5, in the Book of Common Prayer, was deleted therefrom in 1857.

centuries and which is still found in the bells of today. Eloquent of this pride in their work was the fate of the last of the Bilbies, a famous west-country firm of bellfounders, who in 1814 took his own life because he could not get the bells of Collumpton, in Devon, in tune.

Fully conscious of their inspiration and their message, the makers gave their bells an individuality seldom found in inanimate things. Thus many inscriptions were in the first person and these often concluded with the name or signature of their maker and the date of casting. The old *fecit me* or the equivalent in English, "made me," has endured all through their history and is in use still. As far back as the 13th century there was and is still a bell at a church in Norfolk with the inscription: "*Magister Johannes Riston me fecit*, 1299," and much later at Limpsfield, Surrey, "Bryan Eldridge made me, 1619." Bryan Eldridge was a well-known bellfounder who made over 100 bells for Surrey and Sussex churches.

Inscriptions

Then there are the "personality" inscriptions which have a charm of their own. Of such as these are, one at Keynsham, Somerset:

"I value not who doth me see
Thomas Bilbie casteth me."

and,

"Although my sound it is but small
I will be heard amongst you all, 1791,"

and at Backwell, Somerset:

"Bilbie and Boosh may come and see
What Evans and Nott have done by me, 1768,"

also at Backwell, another bell has on it:

"I sound to bid the sick repent
For hopes of life when breath is spent."

At Purton, Wiltshire, is found:

"I am called the widow bell
And when they die do wring their knell.
A. Rudhall, 1736."

Also is found, by the same maker:

"Pull on brave boys I'm metal to the back
But will be hanged before I crack.
Abram Rudhall, 1750."

Even more attractive are the inscriptions in which the bells speak as a ring, collectively. This occurs when all the bells in the ring were originally cast by the same maker. In Chelmsford Cathedral is found:

"Tho much against us may be said
To speak for ourselves we are not afraid."

And at St. Andrew's, Norwich:

"Let us Tewne and sound together
Ingland's sweet peace for ever,"

and at Fen Ditton, Cambridge:

"Fear the Lord and on Him cast
William Hausley made us all, 1623,"

and at St. Andrew's, Plymouth (recently rebuilt):

"Thos. Bilbie cast all Wee, 1748."

Sometimes the metal of which bells were made was melted down and used again to recast a different number of bells. Evidence of this is found at Woodstock, Oxford:

"William Bagley and Harry Bagley
Did us fix out of five into six, 1708,"

and at Shaftesbury, Dorset:

"A wonder great my eye I fix
Where was but three you may see six, T. P., 1684."

(Thomas Purdie)

And also:

"We trebles came by same consent
Our birth we hope will give content,
Twins from old Tenor, our lost old Dad,
Some are made merry and some made sad."

Sometimes the inscriptions were in the form of intercession for the sovereign.

"God preserve Queen Anne."

"God save the King. Tobias Norris cast me 1674."

"God Bless King William, W. C., 1710."

(William Cockey)

"God Bless the King and Queen. Edward Arnold, St. Neots, fecit 1781."

And sometimes there were invocations to saints. At Walton, Suffolk, "Sancte Johannes Ora Pro Nobis, 1500," and at Eastwood, Essex:

2nd Bell: "St. Katherine pray for us."
3rd Bell: "St. Gregory pray for us."

(William Burford, 1380)

Homes of Bells

The traditional home of bells is in the tower or belfry which in size and architectural beauty ranges from such stately edifices as York and Tewkesbury and the majestic near-perfection tower of Magdalen College Chapel, Oxford, to the humble artistry of the village towers, some of which may be mere belfries of timber. There are also the detached belfries known as campaniles, of which those at Chichester and Hexham are among the most massive. These campaniles were not always merely whims of an architect's mind but—as at Beccles, Suffolk—a structural necessity.

Here the architect was advised not to attach his tower to the west end of the nave as owing to sloping ground there would be danger of collapse. The normal position of the tower is at the west end of the church, in cruciform churches it is generally placed at the crossing. Although the chief purpose of the tower was to house the bells, it was often used for other purposes. It was used to provide refuge in times of danger. It was often used as a beacon, a cresset standing on top to add to the ringing of bells, a flare as warning as at Brandon, Suffolk, where it guided folk crossing the fens and barges navigating the river.

Itinerant Founders

Bells were often cast *in situ* or at any rate near to the church for which they were intended. Probably a foreman would be sent from some distant foundry. This appears evident from the fact that many makers produced bells for churches remote from their foundries. Thus, at Northenden, Cheshire, this inscription is found:

"Here goes my brave boys,
Abram Rudhall made us all, 1750."

Ancient Bells and their Founders

Abel and Abraham Rudhall moved their foundry from Gloucester to join Thomas Mears at the Whitechapel foundry in 1750. The foreman who was itinerant—there were also independent itinerant bellmakers working on their own—would set up a temporary foundry near the church. Evidence of these local foundries is found to-day in place-names. Hence at Witham, Essex, near the parish church there is the "Bell Field." The names "Bell Yard" and "Bell Lane" are quite common. The local foundry set up in the village and the number of bells cast therein doubtless account for the names of inns containing the word bell or bells. The Bell at Edmonton is immortalised in John Gilpin's precarious ride. Also well-known, is the "Bells of Ouseley," Old Windsor, and at Bolney, Sussex, the "Eight Bells" Inn* stands opposite the church which has eight bells. Near two churches in Norwich is Foundry Yard. Linked with these local foundries are a number of stories; one is as follows: An itinerant bell-maker in East Anglia, finding himself a bit short of metal, betook himself to the nearby "Rose and Crown" and helped himself to the pewter pots, cooking utensils and measures, using these in the melting-pot for his bells.

The Devil who finds his way into many legends has not, according to tradition, omitted to turn his malevolent attentions to bells, presumably because they summon the faithful to prayer. At East Bergholt, in Suffolk, he is said to have knocked down the bells from the tower so that they could no longer be hung there. For centuries the bells have been housed in a cage on the ground. The Devil is also said to have had a grudge against the fifth (since 1924, the sixth) bell at Danbury, Essex, and for years no bell-ringer would ring it. It seems that this bell replaced the one which he stole from the tower. As in many other legends where the Devil has been held responsible for such behaviour, it is said that he had to drop it (he has been said to have dropped islands in the sea!) and the place where it fell is still named Bell Hill, and there to this day it is said to lie hidden. The present bell has hung undisturbed by Satanic vengeance since it was cast and inscribed by Miles Gray of Colchester: "Miles Gray Made Me, 1642." The third bell, recast by Charles and John Mears of Whitechapel, is older and bears the inscription: "Robertus Motus Made Me, 1575."

At High Wycombe, Bucks., there is told the story of a former ringer of the "Mattins" bell who had to leave his bed early each morning to perform this duty. It is said that he would ring the tenor bell and, having set it in motion, leave it to ring itself down while he returned home. He boasted that he could be back in bed at Newland some distance away before the bell had ceased to ring.

Pre-Reformation Period

In reference to bells it is usual to speak of them as being "pre-Reformation" or otherwise. The Reformation of the Church in England took place during the reign of Henry VIII and the short and tragic life of Edward VI. Owing to the changes in services and procedure, many churches lost their bells (and much else). Fortunately many have survived either as originally cast or as recast and these are now termed "pre-Reformation."

Amongst early pre-Reformation bells may be found one at Brightlingsea, Essex, "*Hic signum serva Christo Maria Thoma*, 1336." At Maldon (All Saints), Essex, "*Fynn Ricardus et Sueyn Johannes*, 1390," and at Great Waltham, Essex, "*Peter de Weston*, 1336." The number two bell at Limpsfield, Surrey, has the date 1350, and at Cowden, Kent, are three bells by R. Burford, 1392. The second largest bell in Bristol Cathedral bears the inscription "*Clara Vocor Clarior ero*, 1300." This is the earliest bell in the diocese. There is a bell at Newton, Cambridgeshire, cast by Austen Bracher in 1370. William de Norvica was casting bells in Norwich bell foundry in 1384. At Hellesdon, Norwich, is his earliest bell.

Whitechapel Bell Foundry

Whitechapel has been the centre of a colony of bellfounders for over 500 years. It is known that William Burford was in business at Aldgate towards the end of the 14th century, for bells inscribed with his initials W.B. and his crosses are found in a number of towers. He was succeeded by his son Robert in 1392. At that time Aldgate was the centre of St. Botolph's and this was adopted as the bellfounder's church. Early in the next century, about 1430, John Danyell, of whom mention has already been made was at work at Whitechapel. He was followed, about 1460, by Henry Jordan. After him came Arnold Warner, one of whose bells, the oldest of eight at Cranleigh, Surrey, has the inscription: "*Prays God.* 1509. *A.W.*"

Shortly after (1513), William Land moved from Bury St. Edmunds to nearby Houndsditch. One of his bells at Wilmington, Kent, bears the date 1516. In 1533, Thomas Osborn, who had worked with Arnold Eayre at St. Neots (Hunts), moved to Whitechapel, and in 1570 Thomas Mot took over the foundry which exists today in full production under the ownership of Meats & Stainbank, Limited.

Thomas Mot transferred the business to a bellfounder named Carter and he was joined by the brothers Bartlett, James and Thomas. At Aveley, Essex, the fourth bell has on it "*James Bartlett*, 1618," and the fifth bell has "*Thomas Bartlett*, 1618." There was at this time at work nearby, one John Hodson. He put his initials on his bells as did his foreman, William Hull who was an itinerant worker, and who died in 1687. Another of John Bartlett's foremen was Philip Wightman. He cast a number of bells, among them the "ting-tang" bell at Enfield Parish Church, Middlesex (1680). (There is another so-called "ting-tang" bell at St. Helen's, Abingdon-on-Thames and

* Also the "Eight Bells," near St. Peter, Mansfield, Nottinghamshire.

another at Burton Lazars, in Leicestershire.) Philip Wightman was manager of the Whitechapel foundry and worked with John and Christopher Hodson. The latter took over the foundry in 1687. He also opened up a branch foundry at St. Mary Cray, Kent, which produced the "Tom" of Christ Church, Oxford.

The Bartletts were at Whitechapel for many years; the last of them died in 1701. Richard Phelps then came to Whitechapel from Avebury, Wiltshire. His first bell seems to have been cast for Barham, Kent, 1702. He cast over 80 Kentish bells and about the same number in Surrey. At Greenwich, four bells have the inscription "Gift of our gracious Queen Caroline. R. Phelps, *fecit* 1731," and at Enfield Parish Church, "Richard P. made me, 1724," also at Newhaven, Sussex, "R. Phelps *fecit* 1737." He also cast the treble bell for Stanford-le-Hope, Essex (1734), eight bells for St. Mary's, Cambridge (1734), and six bells for Abbot's Langley, Herts (1735).

More-recent History

Soon after casting these bells he was succeeded by his foreman, Thomas Lester, to whom he left the foundry and site. Lester moved almost at once from this site which was at the "Artichoke" to another named "The Three Bells," which emblem is still used in the trade-mark of the foundry. His earliest bell is dated 1738, his latest, 1769. Lester became associated with Thomas Pack and a ring of bells at Beccles, Suffolk, was cast by them. When Lester died in 1769, Pack took William Chapman into partnership. Pack and Chapman bells appear until 1780. For a short period the firm must have been known as Lester, Pack and Chapman at "The Three Bells" in Whitechapel, as bells with this signature appear at about this time. Thomas Pack died in 1781.

After Chapman's death in 1784, William and Thomas Mears came from Canterbury to Whitechapel. These two worked the foundry until 1791. A bell at Ightham, Kent, has on it "W. and T. Mears, late Pack and Chapman of London, *fecit* 1789." Thomas Mears succeeded his father William in 1789 and worked the foundry by himself until 1805, when he was joined by his son, also Thomas; from 1810 this Thomas was on his own. Among his bells is "Great Tom" of Lincoln. He was succeeded by his sons Charles and George (1835). Three of their bells are at West Wittering, Sussex —"C. and G. Mears, 1845." They also recast the bells at Danbury in 1846; and again appear to have had a branch foundry at Oxford.

Other London bellfounders include John Darbie who came from Kelsale, Suffolk, 1662. He cast a number of bells for East Anglian churches. John Warner and Sons came to Cripplegate from Sudbury, Suffolk, in 1874. They recast bells at Great Waltham, Stifford, and Chelmsford Cathedral, in Essex, and for St. Peter's, Sudbury, and for Limpsfield, Surrey.

John Waylitt was an itinerant bellfounder who worked at several London foundries and on his own. He cast about 20 Hertfordshire bells and others in Essex (1790-1815). Thomas Janaway, of Chelsea, one of the few founders west of the city, made among others, eight bells for Bletchingley, Surrey (1780) and for Bromley, Kent (1773), and four for Wootton Bassett (1781).

* * * *

The above article has special significance just at this time, when Bow Bells, re-cast at Mears & Stainbank's Whitechapel Bell Foundry some little while ago, have now been rehung and on December 20 rang out again from St. Mary-le-Bow, Cheapside, E.C.2. (The Duke of Edinburgh, who was present at this ceremony, participated in the celebration by ringing one of the bells.)

Publications Received

Ionizing Radiations: Precautions for Industrial Users. Published for the Ministry of Labour by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 6d. post free.

Many foundries, especially those making steel castings, are by now familiar with the precautions necessary when handling ionizing radiations. The booklet states that "with proper forethought and care to counter the risks, the health of workpeople need not be in danger. If, however, there is no justification for fear, there is equally none for carelessness or complacency," it adds. This is a useful book to keep in the laboratory for, in addition to dealing with the various risks involved, it also details the legal provisions for the protection of personnel against ionizing radiations imposed by the Ionizing Radiations (Sealed Sources) Regulations, 1961.

Guide to Metallurgical Information. Edited by Elizabeth W. Tapia, and published by the Special Libraries Association, 31 East 10th Street, New York 3, New York, USA.

This is an interesting compilation and differs markedly in the detail of its content from similar publications in this country. There are some omissions, but because of the wide field covered there are many references fresh to the home reader. However, the more one scrutinizes this 85-page brochure, the more one admires the coverage, the correctness of the entries and the intelligent arrangement of the matter presented. Moreover, the book is splendidly indexed. No price is quoted but if copies are distributed free of charge, recipients can indeed count themselves fortunate.

Clean Air Year Book, 1961. Published by the National Society for Clean Air, Field House, Breams Buildings, London, E.C.4.

This issue contains a digest of the Clean Air Act. If one doubts the need for legislation on this matter it is only necessary to refer to a table on page 37, which itemizes the total annual cost of pollution of the air at £152,500,000. The book contains a wealth of information germane to this important subject which is not easily come by in any other single publication.

Accidents, How they happen and How to prevent them, No. 49. Published for HM Factory Inspectorate by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 7d. post free.

This issue contains no references to foundry accidents, but details one which occurred in a steel-melting shop. A man's death was caused by his being picked up with the scrap by an electromagnet, the accident being caused by faulty signalling to the crane driver.

Russian Abstracts

Recent abstracts from published articles on Russian foundry technology include the following (in each case the author, source and reference information is quoted).

"*Problems of the Production of Foundry Moulds with the Use of High Specific Pressures*," by J. Dlezek. *Slévárenství*. 1960. VIII **10** 341-347: Results are given of research into the flow of typical moulding mixtures during filling and compression. By an investigation of the relationships between the load on the mixture during compression and the deformation produced, conclusions were drawn for assessing the quality of mixtures from the aspect of their ramming and flow properties. Mixtures with low moisture content proved the most suitable and produced accurate moulds with a smooth surface. In accordance with graphical functions it is possible to predetermine the porosity and hardness of moulds which have been compressed at various pressures and from the porosity value to establish the approximate roughness of the surface of the (grey iron) castings produced from such moulds.

"*Spotty Blowholes in Shell Castings*," by R. Kloda and J. Ornst. *Slévárenství*., 1960. VIII **11** 387-388. The faults described are pores of various sizes and shapes irregularly distributed at various depths below the surface of a shell-moulded casting. The cavities have a strongly oxidized surface and as a rule contain non-metallic inclusions, *e.g.*, grains of sand. Examination of their causes and occurrence in practice confirms that the fault may be eliminated by reducing the resin content, improving the uniformity of the mixture, adopting a higher pouring temperature for the metal so that gases can still escape through the liquid metal, and improvement in the surface smoothness of the shells.

"*Centrifugal Casting of Heavy Bronze Bushes*," by R. Koule. *Slévárenství*, 1960. VIII **11** 388-391: By the centrifugal casting of bronze ships' bushes the labour cost per ton of castings can be reduced by about 50 per cent. as opposed to sand-cast bushes, states the author, and the yield of metal rises by about 70 per cent. Castings produced in this way had reliably high and constant mechanical properties and met the highest demands for cleanliness and soundness.

Stoke-on-Trent Metallurgical Society

Chairman of the newly-formed Stoke-on-Trent Metallurgical Society, is Mr. N. B. Rutherford of Thomas Bolton & Sons, Limited. Mr. E. S. White (Birkett, Billington & Newton, Limited) has been elected vice-chairman; the treasurer is Mr. D. Clarke (Royal Ordnance Factory, Crewe) and the secretary, Mr. B. M. Hardman (North Staffordshire College of Technology, Stoke-on-Trent). The eight members of the committee are Mr. G. H. Charsley, Mr. J. Dowell, Mr. D. Heath, Mr. D. Lowe, Mr. W. J. Williams, Mr. T. J. Stanistreet, Mr. J. L. Wolfenden, and Mr. C. S. Dobson.

The first meeting of the Society is to be held at the Town Hall, Hanley, on January 9, 1962, at 7.30 p.m., when Mr. Tom Grey-Davies, secretary of the Newport & District Metallurgical Society, will be speaking about the "Function of a Metallurgical Society." Further particulars may be obtained from the secretary, Mr. B. M. Hardman, at the North Staffordshire College of Technology.

British Employers' Comment

The following items have been reprinted from a recent bulletin of the British Employers' Confederation. The first two news items show how seriously the expansion of this country's export trade is likely to be further challenged by rising costs, and the second deals with the UK *vis-à-vis* the Common Market.

Costs are Critical

The bulletin recorded the announcement of an increase of 7½ per cent. in road haulage rates affecting deliveries of both materials and manufactured goods. The reasons given by the Rates Committee of the Road Haulage Association for recommending the increased rates were (1) the rise in road haulage wages coming into force on January 1, 1962, (2) the increased vehicle excise duty and higher fuel and lubricating oil taxes and (3) other increased costs such as vehicle insurance. During the year ended November, 1961, wages in the road haulage industry rose from 5s. 11d. to 6s. 3d. on each £1 of the operator's expenditure.

Also recorded was the announcement by the National Coal Board of certain increases in the price of coal for non-domestic uses, the burden of which again will have to be borne by industry.

Opportunity to Attack

The BEC says that if agreement is reached between this country and the Six, Britain should be a member of the EEC some time during 1963, and duties charged by the Six on British goods will then be reduced by about 50 per cent. This will be the opportunity for our suppliers to attack hitherto neglected markets and to create the sales and service organizations which are required for a major sales drive. But we cannot be competitive if, as tariffs go down, costs go up.

Nor should it be forgotten that tariffs on goods arriving in this country will be similarly reduced. Continental industrialists will neither stand aside while we enter their markets nor will they refrain from an effort to capture a share of Britain's domestic market—still the richest in Europe. Our costs in making goods for the home market will have to be just as competitive as on goods for overseas.

Scientists and Engineers Survey

Employers are being asked to co-operate with the Ministry of Labour in a survey of the number of qualified scientists and engineers employed in industry.

Information obtained in these enquiries is necessary to the Scientific Manpower Committee of the Advisory Council on Scientfic Policy in preparing estimates of the country's future requirements for scientists and engineers; the Ministry states that these estimates in turn have been of great value to those concerned with planning the expansion of university and higher technical education. Besides showing how far supply is keeping up with demand, the survey provides a useful estimate of industry's own requirements during the next three years.

Enquiry forms will, as before, be sent to establishments in manufacturing industry employing 500 workers or more and to a representative sample of establishments with fewer than 500 workers. The Ministry intends to send out forms this month for completion by the establishments concerned as soon as possible after the end of the year.

Equipment & Supplies

Fluid-density Gauge (Nucleonic)

Now that founders are moving towards fluidization handling techniques, nucleonic fluid-density gauges are of interest. For example, they can be used to give a continuous indication of the density of a wide range of liquids and slurries flowing through piping under constant pressure. The principle operation is one which Baldwin Industrial Controls, Dartford, Kent, has developed—a radioactive source and an ionization chamber are mounted on opposite sides of a pipe containing liquid or slurry. The radioactive source emits radiations which pass through the pipe wall and are absorbed by the fluid in proportion to its density. (Provided that, if necessary, the pipe wall is treated to avoid corrosion effects, it will absorb a constant amount of radiation which can readily be compensated for). Radiation reaching the ionization chamber sets up a current flow which is inversely proportional to fluid density and can be used as a basis for measurement. Besides giving a meter or chart recorder indication, the signal from the ionization chamber can be used to control fluid density *via* suitable transducers, or, for example, to actuate alarm devices when set limits of density are exceeded. Due to the wide variety of applications for which density gauges are suitable each instrument is designed to meet the particular requirements of users concerned.

Carbon Equivalent by Thermal Analysis

Following investigations carried out at the British Motor Corporation's foundries in conjunction with the British Cast Iron Research Association* into fast measurement of Carbon-equivalent (CE) values by thermal analysis, Honeywell Controls, Limited (Ruislip Road East, Greenford, Middlesex), have developed commercial equipment that will enable CE values of molten metal to be checked in time for corrections to be made to the composition of the iron prior to casting. The method, successfully in use in B.M.C. foundries (Figs. 1 and 2), is reported to be cheap, quick and simple to carry out.

Technique

A small sample of iron from the ladle is poured into a simple sand mould. A sheathed thermocouple, with a range up to 1,550 deg. C., is inserted, and a continuous temperature record is obtained on a strip chart recorder/indicator during cooling of the sample. The CE value is obtained by an equation involving the carbon, silicon and phosphorus contents of the iron. For convenience, the chart and scale can be graduated in carbon equivalents. Use of the new technique is limited to the determination of CE values for hypo-eutectic irons, *i.e.*, cast irons having a carbon equivalent value below 4.3 per cent.

* See also JOURNAL October 26, p. 527, and p. 805, of this issue.

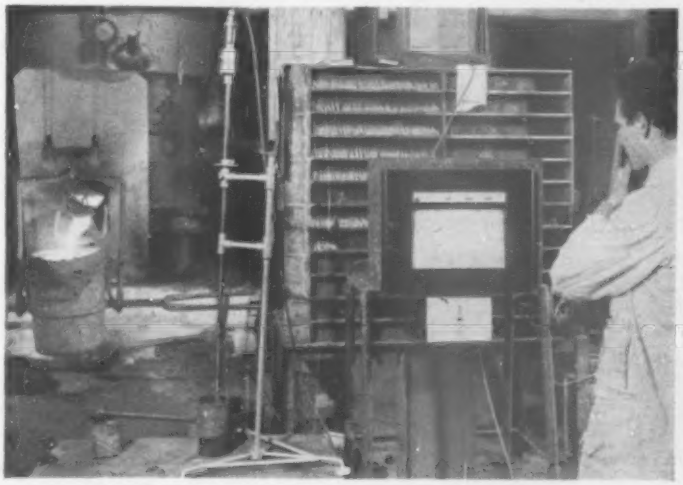

FIG. 1.—*Carbon Equivalent values of liquid cast iron being determined by a rapid low-cost method prior to casting at the Nuffield Foundry of British Motor Corporation, by use of immersion pyrometry and recording. The special thermocouple assembly on a stand is shown in the centre, with a sample under test.*

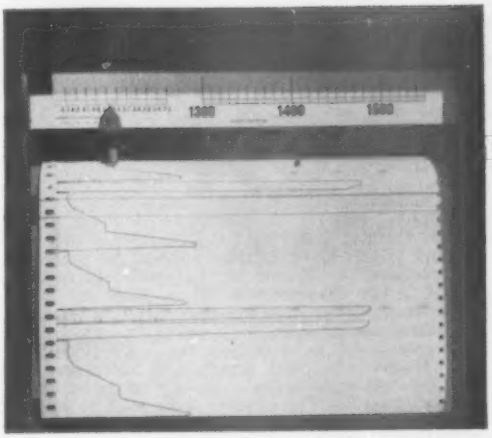

FIG. 2.—*Trace on a recorder used for determining Carbon Equivalent values. The "arrest point" at which levelling out occurs gives the operator the C.E.v. of the sample.*

Hand Grinder

A new version of the hand angle grinder, type MSF 676, is now available in the UK from Verrolec, Limited, 721, North Circular Road, Cricklewood, London, N.W.2. This model, which can be used for the fettling of castings with a flexible roughing wheel, can be fitted with a range of accessories for such other jobs as the removal of feeder-heads and ingates. The tool is fitted with a single-phase a.c. or d.c. motor,

Equipment and Supplies

having a normal rating of 1.25 h.p., air-cooled and radio screened, and which can be geared from 4,300 to 8,400 rpm, depending upon the requirements of the particular job. The tool weighs from 12 to 15 lb. and its features are stated to include its robust quality, high safety-factor and precision finish.

Investment Material

Johnson, Matthey & Company, Limited, 73/83, Hatton Garden, London, E.C.1, announce that they can now supply an investment material for use in the heat-treatment of Mallory 73 beryllium/copper components. The investment slurry is made by adding water to a powder, and the manufacturers state that investment can be done by pouring the mixture over parts spread out on a shallow tray. The investment sets hard after a short period, and holds the parts rigidly during heat-treatment, but can easily be washed away afterwards. The material is supplied in standard packs of 1 cwt. and trial packs of 28 lb. are available at present. It is stressed that both the material and the technique are covered by British Patent 856,765 and may be used only for the heat-treatment of Mallory 73 alloy.

Sand Aerator/Cooler

Baker Perkins, Limited, Bedewell Division, Hebburn-on-Tyne, Co. Durham, have recently placed on the market their Pekay Sand/Aerator Coolerator (Fig. 3), designed to continuously process and cool foundry sand over a given temperature range, and suitable for mounting on a rubber-belt conveyor. The unit is comprised of two or three rotor blades housed in a mild-steel casing, with the drive for the rotors located on top of the casing. It is supplied complete with sand temperature-probe, "no sand" switch and a water-addition device. Other features of the equipment include a specially-designed undercarriage which, it is claimed, does not increase wear or tension on the belt, and which fits on flat or troughed horizontal or inclined rubber belt conveyors. The units are available to suit belts from 18 to 48-in. wide, dealing with from 25 to 450 tons of sand per hr.

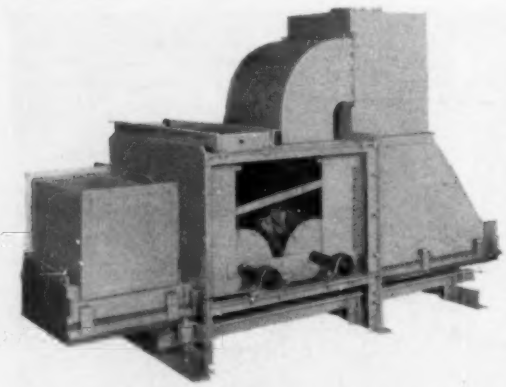

FIG. 3.—*Coolerator, manufactured by Baker Perkins, Limited; the side cover has been removed to show the revolving cutter wheels which mix the water, sand and air.*

Lifting Magnet (Battery-operated)

Rapid Magnetic, Limited, Lombard Street, Birmingham 12, announce a unit for lifting and handling known as the "Magnagrip." Battery-operated and thus independent of mains supply, it is claimed to be of practical use in foundries, machine and assembly shops, warehouses, etc., attached to mobile cranes, fork-lift trucks, or static hoist blocks. No special adaptation equipment or modification to existing plant is needed, it is stated. A recessed control-panel houses the switch, a safety meter for re-charging and a trickle charger socket for quick and simple connection. Battery capacity is available for a full day's working and re-charging is done overnight. Of three models available, one is capable of lifting one ton from a 6-v. supply, one for two tons from 12 v., and the third for three tons from 24-v. supply, all using conventional car-type batteries. (The lifts refer to a solid steel block, with machined surface.)

Cladding for Industrial Buildings: English Steel Corporation, Limited, has approved the placing of a contract with Robertson Thain, Limited, valued at £400,000 for the cladding of the major buildings for their £26,000,000 Tinsley Park project. Both roof and side cladding will be of "Galbestos" sheets which have a steel core, a multiple layer of anti-corrosion treatment and a coloured plastic surface. The sheet has a box-rib profile, the plastic coating will not require painting, and stainless-steel fixings will minimize maintenance, it is stated.

Pressure Recorder: Walker Crosweller & Company, Limited, Cheltenham, have introduced a new type of "Arkon" differential pressure recorder, able, it is claimed, to measure gas or air pressures up to 50 lb. per sq. in. and to withstand static pressures up to 125 lb. per sq. in. The recorder versions have a continuous roll strip chart of 6 in. effective height and six weeks' duration; indicating versions of the instrument are fitted with an 8-in. dia. dial.

Data Sheets: Lees Hall & Sons, Limited, Meeching Road, Newhaven, Sussex, have issued a data sheet of hematite-iron heat-resisting crucibles for the lower-melting-point non-ferrous metals such as zinc and, quite often, aluminium, in the case of die-casting foundries. Using simple-section dimensioned drawings, plus a few tables, quite a wide range of standardized pots and crucibles are covered. It is not everybody's job to make these castings but a covering letter points out that the firm has now about 45 years of experience to draw upon.

BELIEVED to be the largest of its kind ever built in Britain, a six-ton coreblowing machine left the Midlands for Australia on December 15 after gaining for its designers a £5,000 export order in the face of strong US competition. The machine which produces sockets for large pipes was designed by Industrial Foundry Materials, Limited—a Lye firm of foundry design consultants, established only nine years ago—for Stanton Pipes (Australia), Limited. The machine was built under contract by two other Midland firms, the Hymatic Engineering Company of Redditch and the Shell Mould Pattern Plate Company, Limited, Tipton.

American Letter

Carbon Equivalent (CE) of Grey Cast Irons*

A method of determining the Carbon Equivalent of hypo-eutectic grey cast irons in 40 sec. has just been developed by the (American) Gray Iron Research Institute Inc., after eight years of research. Mr. D. E. Krause, director of the Institute, said recently that eight foundries in the US had already adopted the GIRI cooling-curve test, and that it was many times faster than chemical analysis and was more accurate than chill testing: an answer being available before the metal cooled to 1,095 deg. C.

Mr. Krause said that tests made in 1952 had not been successful, but research was continued because of increasing pressure by customers for grey-iron castings with more-uniform properties and the use of cupola charge-materials of less-known composition was resulting in a more urgent need for rapid evaluation of molten metal composition.

The test is based on the measurement of thermal arrest temperature as a sample of molten cast iron freezes, these arrest temperatures corresponding to certain phase boundaries in the iron/carbon equilibrium diagram. Cooling curves are obtained by using thermocouples of bright-annealed 22-gauge Chromel/Alumel wire, each test requiring a new thermocouple. All test samples are contained in moulds made of bonded coresand. The test-sample mould is 1½-in. dia and 3-in. high.

For plant use, the Institute found that a model of a strip-chart recorder having a one-sec. balancing speed, 1-in. per min. chart speed and a self-regulating voltage supply was adequate. A range of 1,093 to 1,370 deg. C., is used and the Institute has arranged for the printing of charts to suit a recorder instrument.

Precautions

Mr. Krause said it was necessary to avoid pouring the test sample at temperatures much over 1,370 deg. C. as the thermocouple might be damaged by higher temperatures; the sample should be poured fairly rapidly without interruption. Further, the instrument

Continued overleaf, col. 1

* See also p. 803 of this JOURNAL.

Superston Propeller made in America

The giant propeller (Fig. 1) made of the high-strength alloy, Superston 40*, will propel the 67,000-dwt. tanker now nearing completion at Bethlehem Steel Company's shipyard at Quincy, Mass. Believed to be the largest propeller ever made in the US, the 32-ton "wheel" was cast and manufactured by Bethlehem's foundry and propeller plant at Staten Island, New York. The illustration shows the propeller being installed on the tanker, now designated as Hull 1680. The propeller is five-bladed, with a diameter of 23 ft. and pitch of 16½ ft., and the rough casting required a melt of 47 tons, stated to be a new US record for a Superston 40 casting. The 860-ft. ship is scheduled for delivery in the very near future, and has a beam of 104 ft. and loaded draft of 43½ ft.; it will be powered by steam turbines, designed and manufactured by Bethlehem, developing 23,000 shaft h.p. at 115 r.p.m.; her service speed will be 16½ knots.

* Alloy developed by J. Stone & Company, Limited, London, of nominal composition: Mn 12, Al 8, Fe 3, Ni 2 per cent. and balance Cu.

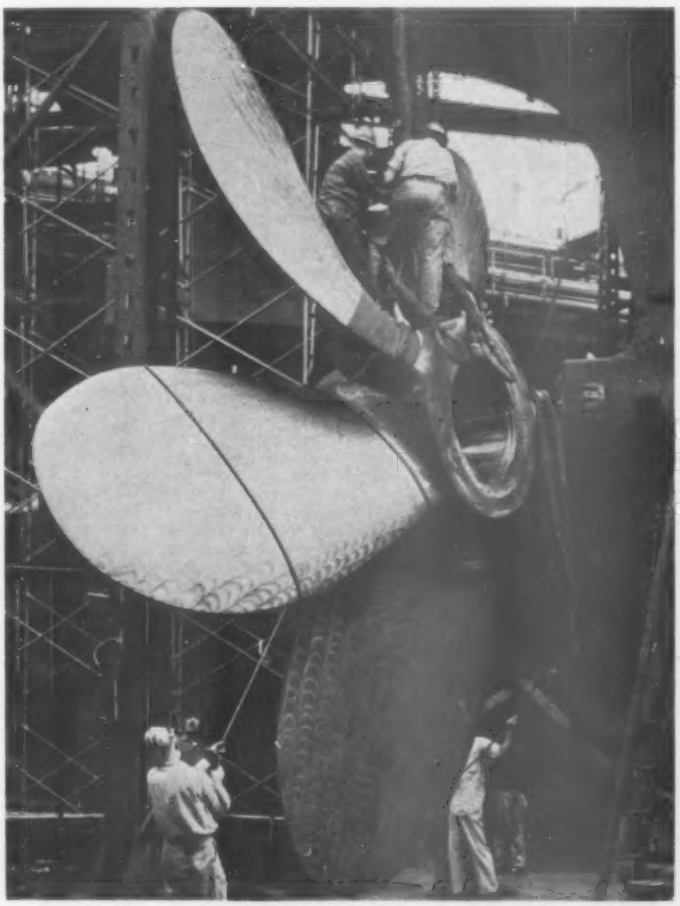

FIG. 1.—*Giant propeller 23-ft. dia. and 16½-ft. pitch being installed on the Hull 1680 tanker. As is the case of the vessel, the propeller was also designed by the central technical department of Bethlehem Steel Company, USA.*

should be turned on at least 10 min. before making tests and may be left on all day. The chart drive should be turned on just before pouring the sample and may be turned off when the sample has cooled below the eutectic temperature.

It was also reported by Mr. Krause that future work was being considered to further the method. The use of a fused-quartz tube increases the cost of the present tests by 10 cents. There were indications also that the present design might be made more compact and that it may be possible to make some type of permanent or semi-permanent mould to cut costs. Thought had also been given to designing a mould which would also include a fluidity test, as accurate reading of pouring temperatures was a necessary part of such a test.

Catalogues

Iron Castings. John Harper & Company, Limited, Albion Works, Willenhall, Staffs, have recently issued a series of well-produced catalogues. Of these S.G.2 tells about spheroidal-graphite cast iron. After an introductory statement, the properties of the material are covered by short readable paragraphs, and a few well-chosen illustrations show the types of components regularly made.

The catalogue, entitled *Door Furniture*, represents quite a different type of publicity, it is of the "give-away" variety meant for ironmongers' customers. A third catalogue, "Harper Castings" is of more general interest as it tells something of the history of the firm, its plant, equipment and products. Included is a summary of the properties of the Meehanite castings which they produce. The illustrations in this publication are particularly interesting in that they show the large variety of industries which use the firm's productions.

Steelfoundry Refractories. Carrying the caption "For Cleaner Steel Castings," a well-produced catalogue has been issued by J. & J. Dyson, Limited, Stannington, Sheffield. It is an essentially modern brochure covering newer applications of fired refractories. In the old days, it was an apprentice's job to make runner-cups and the like, but now it is a better proposition to use a ceramic insert as a precaution against having washed-off sand amongst the metal filling the mould. The idea is carried further by making available runner channels, ingates, and other mould components, all destined to give cleaner metal. The selection listed includes a wide range of strainer cores. The reviewer was interested to find the word "bells," with a new technical meaning, that of a modified form of feeder-cup. This catalogue will be welcomed by all steelfounders, whilst those engaged on the production of important heavy-iron castings could also profit through studying it.

Core-bonding Material. Written in a lighthearted strain, a leaflet on this subject specially prepared by Fletcher Miller, Limited, Alma Mills, Hyde, Cheshire, is quite a good sales effort for the home market, but is unsuited for interesting other than English-speaking nations. The claims for Almarine core-oil are set out in a series of interesting pargaraphs and make better reading than if they were just numerically listed.

Portable Electric Tools. In publication 54, Consolidated Pneumatic Company, Limited, 232, Dawes Road, London, S.W.6, have abridged their detailed list of products so as to give a general picture of the lines of Hicycle tools they manufacture, such as drills, screwdrivers, wrenches, tappers, grinders and sanders. Though it be an abridged version, there are printed in the catalogue sufficient data to give particulars of each tool.

Light Filters. Carrying the rather formidable reference number 203A1221C21½661, Kodak, Limited, Kingsway, London, W.C.2, have issued a 12-page catalogue which details dozens of light filters which enable the photographer, be he amateur or professional, to produce better results. Two—numbered 35 and 36—are respectively magenta and violet and are used as contrast filters in photomicrography.

Steel Castings Specifications. Hadfields, Limited, East Hecla Works, Sheffield, 9, have recently issued a catalogue which tabulates their own specifications and correlates them with the British and, through the latter, with a number of overseas specifications.

Metal Cleaners. A leaflet received from the Metal Finishing Division, Pyrene Company, Limited, Great West Road, Brentford, Middlesex, lists types, operating temperatures (with germane commentary) of 13 kinds of cleaners entering into the Pyroclean range. They are divided into alkali-, emulsion- and soak-type.

* * * * *

Other catalogues received recently at the JOURNAL office include:—

Publication No. GP2, issued by Laporte Industries, Limited, New Bond Street House, 1-5, New Bond Street, London, W.1, a 56-page catalogue in which are listed nearly 300 chemicals manufactured by companies in the group, from acetylsalicylic acid BP to zirconium organic compounds. The products of the Fullers' Earth Union, a subsidiary company, are also included.

A second edition of "Molybdenum Disulphide in Action" has been released by K. S. Paul (Molybdenum Disulphide), Limited, Angel Road, London, N.18. A general description of MoS_2 and its suitability as a lubricant, is followed by a series of reports on industrial applications, dealt with in eleven sections.

In publication No. 961, Richards Structural Steel Company, Limited, Phoenix Ironworks, Leicester, use much tabular matter to describe and illustrate their very extensive range of Thorite motorized drums for conveyor drives.

Pollard Bearings, Limited, Ferrybridge, Knottingley, Yorkshire, have issued an eight-page folder (*Ref. 50M/10/61*) to cover details of components used for power transmission through the use of bearings.

In the 20 well-illustrated pages of publication *No. BA80*, Turner Brothers Asbestos Company, Limited, P.O. Box 40, Rochdale, cover the types and qualities of conveyor belts they manufacture.

* * * * *

Pyrometer Sheaths: When reviewing a catalogue on this subject from Morganite Research & Development, Limited, in the JOURNAL of November 30, the temperature range of No. 612 Metamic Sheath was incorrectly quoted. It should have been stated that the No. 612 sheath is suitable for use at temperatures up to 1,450 deg. C.—(apologies are made to readers and the firm concerned).

Notes from the Branches

Lancashire

Two students from the Bolton Technical College, Mr. Gregory and Mr. Davis, and their teacher in foundry subjects, Mr. Collier, were the lecturers at the December meeting of the Lancashire branch of the Institute of British Foundrymen.

Mr. Collier, in his paper, entitled "Which Way to Go?—Some Problems and Aspects of Foundry Technical Education," commenced by reviewing the development of technical education in this country. In this respect he said the UK lagged behind America, Germany and Russia for "although we had the talent we lacked the vision to develop it." He praised the training schemes of the National Foundry College and the British Cast Iron Research Association but condemned the examination system which ruled that a moulder or patternmaker could not receive a diploma which would enable him to become a technician or a manager. In conclusion he outlined the methods of training employed at the Bolton Technical College.

Mr. Gregory then read a paper on "Problems in a Repetition Foundry," in which he dealt with plant layout, working conditions, training of apprentices, and how economies in production could be effected by work-study. He was followed by Mr. Davis who described in his paper the "Production of a Large Cast-iron Cylinder," which weighed about 15¼ tons and was cast vertically. Mr. Wallwork proposed a vote of thanks to all three lecturers, which Mr. Booth seconded. The meeting concluded with the chairman proposing a vote of thanks to the lecturers.

The general trend of Mr. Colliers' replies to questioners was that amongst the patternmakers, moulders, and coremakers in foundries there were many who had the ability required for the jobs of technicians and managers, and it was a pity that lack of examination qualification prevented them from advancing to the higher levels. It was ridiculous he said that a student moulder should not be allowed to do engineering drawing, and thought that the age limit of 16½ years for entering the industry could be raised if there was co-operation between employers and the unions. Other points made by the lecturer were that mechanization was employed in the UK before it was introduced in America; of the threat to the casting's industry from "fabrications," he thought it should be possible to produce a casting more cheaply and more quickly than any fabrication.

Tees-side

The annual social evening of the Tees-side branch, which this year took the form of a dinner/dance, was held, by kind permission of Head Wrightson & Company, Limited, at the Teesdale Hall, Thornaby-on-Tees, on November 10. The branch president, Mr. T. Hurst, and Mr. D. A. Richards, national president, and their ladies, received members and their guests. Speeches were confined to a welcome from Mr. Hurst and a response by Mr. Richards and the branch secretary. Dancing then took place until 1 a.m. with a short interruption for excellent entertainment. The marked success of the dinner/dance, which was an innovation for the branch, makes it likely that it will be a permanent feature.

Newcastle-upon-Tyne

Following the president's visit to Tees-side he proceeded to the Newcastle branch area where on Saturday, November 11, he attended a meeting of the branch Council, followed by a general meeting of the branch at which Mr. C. A. Timms presented a very thought-provoking paper "Random Thoughts on the Production and Selling of Non-ferrous Castings."

Mr. Richards was warmly welcomed by the branch president, Mr. E. Charlton, and addressed members of the branch prior to Mr. Timms' lecture. After the meeting the president, Mr. Timms, and the secretary were entertained by the branch Council. This year marks the semi-centenary of the founding of the Newcastle branch, and arrangements are well in hand for celebration of this "milestone" in April, 1962.

Translation Services

From amongst the most-recently-published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

BISI 1863 QUALITY CONTROL IN THE IRON AND STEEL INDUSTRY. (From Italian.) Odone, G. Convegno sul Controllo statistico della Qualita (Conference on statistical quality control), Milan, Oct., 1959, 1-11. (£5 5s.)

BISI 2378 MODERN CONTINUOUS-PICKLING PROCESS (SPRAY PICKLING). (From German.) Moehring, H. *Metall-Rein.*, 1960, *9*, Jan., 3-9. (The full text, with illustrations, of the article which was summarized in BISI 1979 (Fortnightly List 101). (£4 15s.) A general description of modern continuous-processes of pickling, degreasing and washing is given, with particular reference to treatments prior to enamelling. (*JISI* abstract.)

New translations in course of preparation include:—

BISI 2526 DETERMINATION OF THE COOLING CAPACITY OF QUENCHING BATHS. (From Italian.) Pesante, T. *Met. Ital.*, 1952, *44*, Apr., 145-152.

BISI 2527 DIRECT SPECTROPHOTOMETRIC DETERMINATION OF ALUMINIUM IN STEEL. (From Italian.) Picasso, G. *Met. Ital.*, 1961 (5), 269-276.

BISI 2531 WEARING TEST OF MATERIAL FOR ROLLING-MILL ROLLS. (From Russian.) Vorontsov, N. M. Trudy Mezhvuz. Naucho-tekh. konf. na temy "Sovremennye Dostizheniya prokatnogo proizvodstva" (*Proc.* of Inter-VUZ conference on "Achievements in Rolling Practice"). Leningrad, 1959, *2*, 367-372.

BISI 2566 APPLICATION OF POLARIZED LIGHT TO THE STUDY OF THE STRUCTURE OF IRON AND STEEL. (From German.) Schafmeister, P., & G. Moll. *Arch. Eisenhütt.*, 1936, *10*, Oct., 155-160.

Industrial Research in Spain. A recent Decree authorizes the setting up of industrial research associations in Spain by companies in the same industry to study technical problems related to work methods and production levels. The associations will be supervised by the *Comisión Asesora de Investigación Científica y Técnica.*

IN FUTURE, Yale Trojan tractor shovels are to be sold and serviced in the United Kingdom through the established sales and service organization of the materials handling division of Yale & Towne Manufacturing Company, Wednesfield, Staffs.

AMONG APPOINTMENTS which the Minister of Pensions and National Insurance has made to his Industrial Injuries Advisory Council for the new term which began on November 30 are Mr. W. Lewis Clarke (chairman of the B.E.C.'s Mines and Quarries Committee) and Mr. E. C. Happold (secretary of the Engineering Employers' Federation), both re-appointed, and Mr. S. Chapman (director of the Association of Chemical and Allied Employers), newly appointed.

Personal

Mr. KEN HAYTHORNE won three of the eight major awards in the annual exhibition of the Photographic Society of Hadfields, Limited.

Mr. H. C. MAYER, executive director and secretary of Griffin & George, Limited, and its subsidiaries, has been appointed deputy managing director of the group.

Mr. R. L. PLACKETT, reader in mathematical statistics at Liverpool University, has been appointed to the newly-created Chair of Statistics at King's College, Newcastle.

Mr. H. M. MYERS, works manager at the Witton branch, Birmingham, of Imperial Chemical Industries, Limited, has retired after more than 40 years' service with the company.

Professor J. P. DUNCAN, head of the department of Mechanical Engineering at Sheffield University, was installed on December 11 as president of the Sheffield branch of the Junior Institution of Engineers.

MR. G. ARGYLE has been appointed chief engineer, commercial vehicles, for the British Motor Corporation. At the present time, Mr. Argyle is responsible for the design of large diesel engines and commercial vehicles, catering for 10-cwt. payloads to 7 tons.

Mrs. D. GODLEY, a member of the small-saw department of James Neill & Company (Sheffield), Limited, Napier Street, Sheffield, has been presented by Colonel Sir Frederick Neill, chairman and managing director, with a gold watch in recognition of 25 years' service.

The Minister of Power has appointed Mr. R. F. SUMMERS, chairman of John Summers & Sons, Limited, to be a part-time member of the Iron and Steel Board with effect from January 1 in place of Mr. A. G. STEWART whose appointment expires on December 31.

Mr. T. V. KELLY, blast-furnace manager at Staveley Iron & Chemical Company, Limited, since 1957, has been appointed iron plant manager for the Rhodesian Iron & Steel Company, Limited. Both companies are part of the Stewarts and Lloyds group. Mr. Kelly, aged 37, has been at Staveley since 1953.

Mr. JOHN JAMIESON has been appointed head of the engineering department of Coatbridge Technical College, of which he has been assistant for some time. A former student of the Royal College of Science and Technology, Glasgow, he has been in Colville's technical offices in Motherwell since before the war.

Mr. J. R. HERDMAN and Mr. B. S. HINES have joined the British Moulding Machine Company, Limited, as sales representatives, the former in Northumberland, Co. Durham, and Yorkshire (with the exception of the Sheffield area) and the latter in Cumberland, Westmorland, Lancashire and Cheshire, plus the Sheffield area.

Mr. LYNN BRADBURY, 20-year-old apprentice of Hall & Pickles, Limited, Ecclesfield, Sheffield, will go to the Continent next spring as guest of the National Gauge and Toolmakers' Association as the award for winning first prize in a national craftsmanship competition. He will spend the fortnight at a well-known European precision-engineering plant.

Mr. JAMES BUCKMAN, formerly project development manager of the Standard Motor Company, Limited, has been appointed general manager of the Bridgwater Machine Company, Limited, of Aycliffe, Co. Durham. This subsidiary of the American Brake Shoe Company, of New York, is now being equipped for the manufacture of tyre moulds for the UK and Europe.

The appointment has been announced of Mr. A. DERBYSHIRE as managing director of Controlled Heat & Air, Limited, the member company of the Incandescent Group. Joining the company in 1939 as chief draughtsman, Mr. Derbyshire was subsequently works manager and in 1945 was appointed a director. He has been largely involved with technical sales and has visited South Africa, India and Canada in addition to the European markets.

Mr. W. ATKINSON ADAM, M.I.MECH.E., has been appointed managing director of the three British divisions of the Yale & Towne Manufacturing Company. He succeeds Mr. JOHN T. MCCARLEY, who has been appointed director of manufacturing of the International operations of Yale & Towne with headquarters in New York. In order to accept the appointment, Mr. Adam has resigned his executive responsibilities with Adam-Hodge, N.V. (Holland), but will continue to serve on the board of directors.

Presentation of a gold watch has been made by Mr. H. Clarke, assistant managing director of the Qualcast group of companies, to Mr. A. "JOE" SARGEANT, for his 40 years' service with Suffolk Iron Foundry (1920), Limited, a member of the Qualcast group. Mr. Sargeant has in his time with the company made more than 32,000,000 ft. of super-silicon cast-iron welding rods. The presentation was one of many made during the Suffolk Iron Foundry annual Christmas party, held on December 15 at the Savoy Ballroom, Ipswich, which was attended by more than 700 people.

Mr. NORMAN TATTERSALL, chief engineer of the engine division of Leyland Motors, Limited, has been appointed a director of Spain's largest commercial vehicle manufacturers, Empresa Nacional de Autocamiones SA. Two years ago a financial link-up was announced between Leyland and ENASA, manufacturers of Pegaso vehicles. Sir Henry Spurrier, Leyland's chairman and managing director, and Mr. Donald G. Stokes, the company general sales and service manager, joined the ENASA board at the same time. Under a previous agreement the two companies have also been interchanging technical information on the development of commercial vehicles. Mr. Tattersall, who retains his present position at Leyland, will act as a technical consultant to the Spanish company.

George Kent, Limited, Luton (Beds), have appointed Mr. R. C. INGRAM to the newly-created post of marketing manager. Other appointments to their sales staff announced are: Mr. K. A. STEELE, formerly assistant industry sales manager of the metallurgical division, has been appointed representative for the outer London area and will operate from the company's London office at 199-201, High Holborn, W.C.1, and Mr. J. C. BARRETT, has been appointed area representative for Surrey, Kent and Sussex. In preparation for the retirement in a few months' time of Mr. H. MOREN-BROWN, who has represented the company in Birmingham for nearly 30 years, two new representatives have been appointed: Mr. G. H. C. LYNN will shortly assume responsibility for the company's representation in Staffordshire and the northern half of Birmingham, and Mr. J. E. BROWN will be the representative for Worcestershire, Warwickshire and the southern half of Birmingham. Mr. D. E. HARVEY is now representative for Manchester, which includes the eastern halves of Lancashire and Cheshire. Following the recent retirement of Mr. J. S. THOMPSON, Scottish representative for 23 years, Mr. R. BARCLAY will operate in the western half of Scotland, and Mr. MILLAR TAYLOR the eastern half of the territory.

Law Cases

Moulder's Claim Fails

A claim for £400 damages for personal injury against the Stanton Ironworks Company, Limited, by a 54-year-old pipe moulder failed at Ilkeston County Court. Mr. William Richard Pratt, who was said to have worked for the company for 42 years, 17 as a pipe moulder, claimed for injury after an accident in a moulding process in October, 1959. It was alleged that Pratt was blacking the inside of a mould when the chains suspending the mould in a 15-ft. pit slipped causing it to move slightly away from him and throw him off balance. He claimed that he strained his abdominal muscles, thus causing hernia. He said he was off work for weeks following an operation for a hernia in March, 1960. Sister Barbara Towers, nursing sister at Stanton, said Pratt saw her nine days after the accident, but according to her records, said he had suffered abdominal pains for four or five weeks.

Judge Sir Henry Braund said in his judgment at the end of a six-hour hearing, that he considered Pratt was already suffering from a hernia when the accident occurred. Costs were awarded to the Stanton Ironworks.

Safety Boots not worn

At Tamworth County Court an ironfoundry moulder, Mr. C. Taylor (37), whose left foot was injured by molten metal, was awarded general and special damages of £149 5s. and costs by Judge J. C. D. Harington. Mr. Taylor, the employee concerned, said he had filled a hand ladle when metal splashed on to his ankle, ran down inside his boot and burned his heel. He told the Court that he did not know he could have obtained safety boots at cost price through the firm . No safety spats or gaiters were provided.

Mr. R. Tucker, for the firm, submitted that even if boots and spats had been provided, the question still arose as to whether they would have been used. Mr. Taylor had admitted since the accident that he had still not worn safety boots or spats.

Judge Harington said that the firm must have known of the hazards from molten metal splashing and should have provided both safety boots and spats. He found breach of duty and therefore negligence.

Carelessness in Handling Clamps

A Fife labourer, Mr. William McDonald Robertson, who sued his employers, John White & Son, weighing-machine manufacturers, of Auchtermuchty, for £2,000 in respect of an accident in the works in September, 1959, was awarded £950 by a jury sitting with Lord Wheatley in the Court of Session on December 6.

Robertson who was struck on the head by a metal clamp weighing 25 lb., while knocking-out a large casting, claimed that contrary to the firm's instructions, his fellow employee threw up the clamps from the moulding pit, and one fell on him (Robertson). The firm claimed that the fellow employee threw up the clamps at a side of the pit away from where Robertson was working; the clamp which struck Robertson was one which he himself had thrown out of the pit.

A FINE OF £20, with 4s. costs, was imposed at Doncaster Borough Magistrates' Court on a local firm of brassfounders, after a plea of guilty had been entered to a charge of failing to fence certain dangerous machinery. It was stated by the prosecution that a 16-year-old apprentice lost part of the first finger of his right hand while operating a power press with a faulty guard. The guard was said to be in a bad state of repair, causing the safety-control device to be useless. Reference was made by defending solicitor to the company's fine record with no previous conviction under the Factory Act.

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They are still using them to-day to produce castings of the type illustrated, which go to make up the well-known GESTETNER duplicator.

More recently two new grades have been introduced to make die casting history, Grade No. 44 and 9X for Aluminium and Zinc respectively.

Both are concentrated lubricants which require diluting before use and WATER may be used for this purpose, thus making them not only the best lubricants but the cheapest.

Write for details of No. 44 (WATER miscible grade) for use with Aluminium and No. 9X, the grade for use with Zinc. We will have pleasure in sending you our literature on this subject, produced, as has been all our sales literature, for a number of years now, on a GESTETNER duplicating machine.

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News in Brief

GEORGE KENT, LIMITED, of Luton, have received an order worth over £5,000,000 from the Central Electricity Generating Board for the supply of instruments for the Drakelow C power-station, Derbyshire.

FORTY SHEFFIELD METALLURGISTS and industrialists have visited Rugby for a demonstration of a 10 kw electro-beam melting furnace by AEI (Rugby), Limited, and Birlec-Efco (Melting), Limited.

THE INDUSTRIAL INSTRUMENTS DIVISION of the Barber-Colman Company, Rockford, Illinois, USA, announces the establishment of a new furnace-atmosphere division to work in a complementary manner with gas chromatography.

ONE-HUNDRED-AND-SEVENTY widows of ex-employees and 250 widows of the works pensioners of Newton Chambers & Company, Limited, have been sent a gift of £2 and a Christmas greetings card from the managing director, Mr. P. J. C. Bovill, and Mrs. Bovill.

B.S.A. TOOLS GROUP, LIMITED, announce that from January 1, 1962, the United Kingdom sales representation for the Churchill Machine Tool Company, Limited, of Broadheath, Manchester, will be carried out by Burton Griffiths & Company, Limited, Mackadown Lane, Kitts Green, Birmingham 33.

NEW ZEALAND GOVERNMENT RAILWAYS have placed an order with the Pressed Steel Company, Limited, Linwood, Paisley, for 900 open wagons, valued at nearly £1,000,000. The order was obtained in face of competition from 21 countries, including a number of European countries, Japan, South Africa, and Australia.

THE 3,500 EMPLOYEES at the Doncaster works of International Harvester Company, Limited, shared £72,500 in profit-sharing bonuses in the week ended December 9. The bonus average was more than £20 for every Doncaster employee, and created a new record, being an increase of more than £10,000 on the bonus payment of last Christmas.

THE INSTITUTE OF WELDING announces a Christmas lecture by past-president Mr. John Strong on "Joining the Modern Way." It will be held at the Institute's headquarters, 54, Princes Gate, Exhibition Road, South Kensington, London, S.W.7, on Thursday, January 4, at 11 a.m. Admission is by ticket only obtainable from the secretary of the Institute at the address quoted.

MARKETING AND PRODUCING FOR PROFIT, control of overheads and effective management of assets will be discussed at the British Institute of Management one-day conference on "Planning for Maximum Profits," to be held at the Connaught Rooms, London, W.C.2, on January 11, 1962, from 9.45 a.m. to 5 p.m. The conference is intended for directors, senior managers and accountants.

THE ENTIRE SHARE CAPITAL of James Shortland & Company, Limited, nail manufacturers, Thistle Nail Works, Wishaw, Lanarkshire, has been acquired by John Williams (Wishaw), Limited, a member of the Thos. W. Ward group. Mr. W. Hall has succeeded Mr. W. N. Shortland as chairman and managing director and Mr. Adam Parkin has been appointed director and secretary.

F. H. BENTHAM, LIMITED, textile-machinery designers and makers, has moved from premises on the corner of Richmond Road and Longside Lane, Bradford, which it has occupied since 1888, to larger premises at Prospect Works, Allerton, Bradford. The Bentham Tyre Machinery Company, Limited, is also at Prospect Works, and the Bentham Press Division remains at Dotcliffe Mill, Kelbrook, *via* Colne.

AVAILABLE ON FREE LOAN from Colt Ventilation, Limited, Surbiton, Surrey, is the newly-revised edition of the film "Fire Control in Industry" bringing the subject of fire venting up-to-date with a record of the three-year Colt sponsored research programme conducted by the DSIR Fire Research Station and with fire venting in action in the Humber fire at Aldermoor Lane. A synopsis of this film is available from Colt Ventilation, Limited.

AN ORDER for an 8,000-ton passenger and cargo liner costing more than £2,000,000 has been placed with John Brown & Company, Limited, Clydebank, by Alfred Holt & Company, Limited, Liverpool. The ship, to be named the Centaur, will have Danish diesel machinery made by Burmeister & Wain, Limited. She will be a single-class ship, with accommodation for 200 passengers; she will also carry refrigerated and other cargo, and will be equipped to transport sheep and cattle.

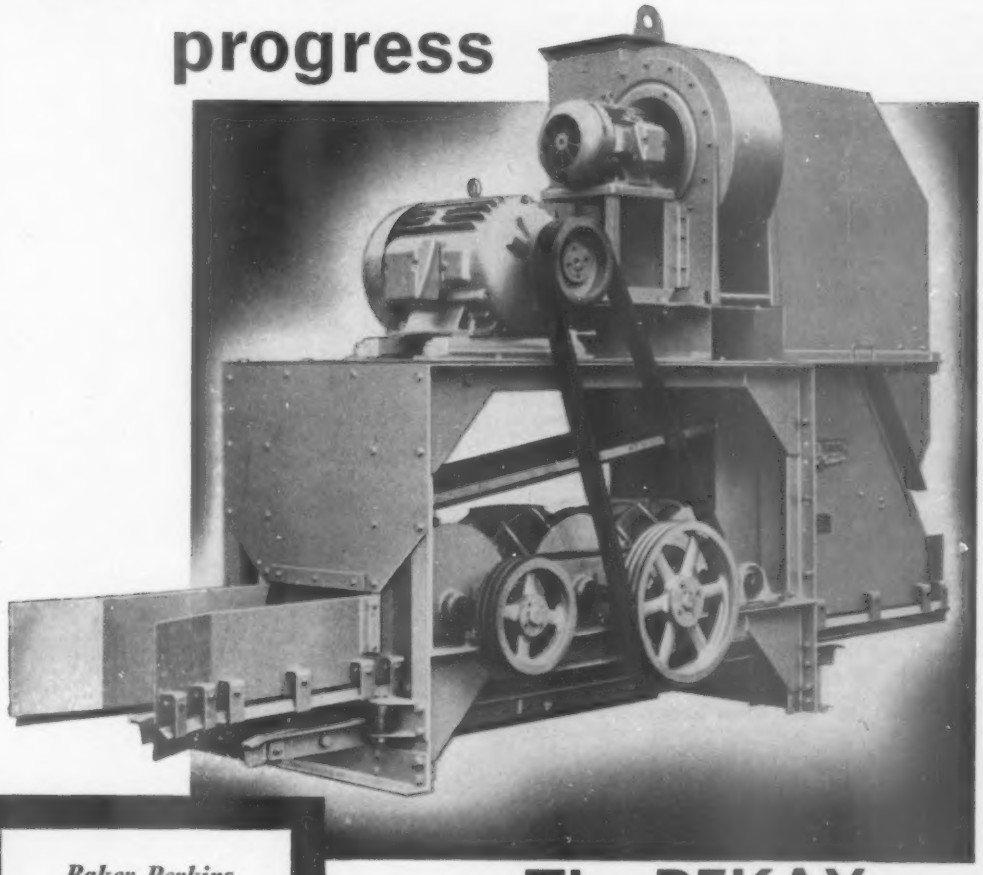
PLANT EXPANSION PROGRAMME for Midland Silicones, Limited, has been taken a further stage by the award of a contract to design and construct tank farm additions complete with piping network. This will give an increased storage capacity of 120,000 gal. of raw materials and products. The contract has been awarded to the chemical engineering division of the Sturtevant Engineering Company, Limited, London, E.C.4, and work is scheduled for completion by June, 1962. The division already has in hand the design and construction of a new reactor unit for Midland Silicones.

LAST WEEK, the Birmingham Industrial Accident Prevention Group opened a new extension to their training centre at Acocks Green, which will play an important part in the 1962 drive. Welcoming the new extension, Brig. Ralph Stoney, director general of RoSPA (the Royal Society for the Prevention of Accidents) underlined the achievements of the group. Among the 2,000 students in 1961, 500 apprentices had passed through the training course (nearly double last year). There were 250 foremen and supervisors (100 increase), 150 crane drivers and slingers (nearly double last year's figure).

IN FURTHERANCE OF A SCHEME to combine the machine-tool manufacturing interests of the Thos. W. Ward group, represented by Woodhouse & Mitchell at Brighouse and Fredk. Town & Sons, Limited, at Halifax, these businesses have been merged under the name of Town Woodhouse, Limited, as and from December 31. The directors of the company are Mr. H. Vernon (chairman), Mr. G. S. Wood, Mr. A. Kissack, Mr. E. Town and Mr. L. Forbes, and the secretary is Mr. J. Taylor. Mr. Town will be responsible for commercial management and Mr. Forbes for works management and technical development.

AN ORDER WORTH ABOUT £250,000 has been secured by the switchgear division of Associated Electrical Industries, Limited, for a sub-station at Aldwarke, near Rotherham, in the north-eastern region of the Central Electricity Generating Board. The sub-station will provide an increased supply to the Park Gate Iron & Steelworks. It will be established in the existing High Marnham-West Melton transmission line. The electronic apparatus division of AEI has been given a valuable order by the Swedish Navy Board for radar display units to operate in conjunction with coastal surveillance radar equipment previously supplied by AEI.

pattern for progress



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* Continuously processes and conditions foundry sand * Fits flat, troughed, horizontal or inclined rubber belt conveyors. * Specially designed undercarriage does not increase wear or tension on belt. * Cheaply and quickly installed. One of the range 10 tons to 450 tons. 18″ to 48″ wide belts. * Increases output and improves quality from existing mixing plant.

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B.P.F. 14

Raw Material Markets

Iron and Steel

Most of the foundries are hoping that the turn of the year will bring an increase in business, as at present many plants are working below capacity and production is restricted to a four-day week. In fact, with the amount of business recently available, some foundries find it difficult to maintain this reduced rate of working. Included in these are some of the foundries catering for the motor-vehicle industry, while those supplying castings to many other trades are similarly placed. The light foundries are expecting that the improved demands from the domestic utensil trade will continue for at least a few more months, and hopes are entertained that increased usage of castings by the building trades in the new year will benefit the light foundries connected with them. The jobbing, textile, and malleable iron foundries could undertake more work.

Pig-iron in all grades continues plentiful, and the steelworks and iron foundries are well provided. Stocks on hand at the furnaces and current production are more than sufficient to satisfy current demands and most of the furnaces are hoping for a bigger demand in the near future, as they could step up present deliveries appreciably. No difficulty is experienced in obtaining most grades of scrap, while coke, ganister, limestone, and firebricks are readily available.

Many of the re-rolling mills are closed for the whole of this week, during which essential repairs are being carried out. Orders for their products are very scarce, particularly for small bars, light sections and strip, while reinforcing rods, although in fairly good demand, are being called for in quantities much below previous levels. Much more work is needed to bring production up to capacity levels.

All grades of steel semis are available from home steelworks in tonnages much in excess of present demands, and mild steel semis in particular are very plentiful. Difficulty is also now being experienced by the steelworks in disposing of all their arisings of defectives and crops.

Non-ferrous Metals

Consumer interest from the Continent stimulated tin prices and lessened the chance of a repetition of the recent liquidation of cash metal on the London Metal Exchange. Trading conditions, however, are still rather thin and turnover in the London market has been small.

The news from Chuquicamata that a strike ballot had been decided on led to a drop in copper prices but there has been a slight rally and trading has been steadily quiet.

Holiday conditions have affected both lead and zinc and little business has been taking place.

IN ANNOUNCING THE APPOINTMENT of Mr. W. T. Mitchell as the new chairman of the Grahamston Iron Company, Limited, it was erroneously assumed—JOURNAL, December 7, page 708—that he was the son of the late Mr. W. T. Mitchell, the former chairman. The Grahamston Iron Company informs us that Mr. Mitchell was the late chairman's nephew. Apologies for the earlier and unwarranted assumption are made to all concerned.

House Organs

Foseco Foundry Practice, No. 149. Published by Foseco, Limited, Drayton Manor, Tamworth, Staffs.

It is interesting to see in Fig. 4 of the first article in this issue on "Gas Holes in Grey-iron Castings" the resurrection of the phenomenon of inverse chill. This defect was a veritable disease of iron castings just after the first world war. As up to that time, there had been a build-up of sulphur content in the world's scrap heap, that element was deemed to be the culprit. When soda-ash and other desulphurizers became widely used, the defect virtually disappeared. Now, according to this article, the "villain of the piece" can be aluminium. In another article, the use of exothermic padding for feeding purposes is lucidly explained.

Wiggin Nickel Alloys, No. 63. Issued by Henry Wiggin & Company, Limited, Thames House, Millbank, London, S.W.1.

Two comprehensive articles in this issue detail the many variables affecting corrosion together with measures that can be taken to offset corrosive atttack. Monel nickel/copper-alloy shafts in conduits for the Tamut Pond Dam are featured in an article on the largest civil engineering project ever undertaken in Australia. This material is also referred to in another application, where it is used in fabricating the shell and water boxes in the evaporator of a new sea-water distillation plant at Aby Dhabi in the Persian Gulf. A further article deals with Nimonic 80A used in die-casting aluminium-bronze.

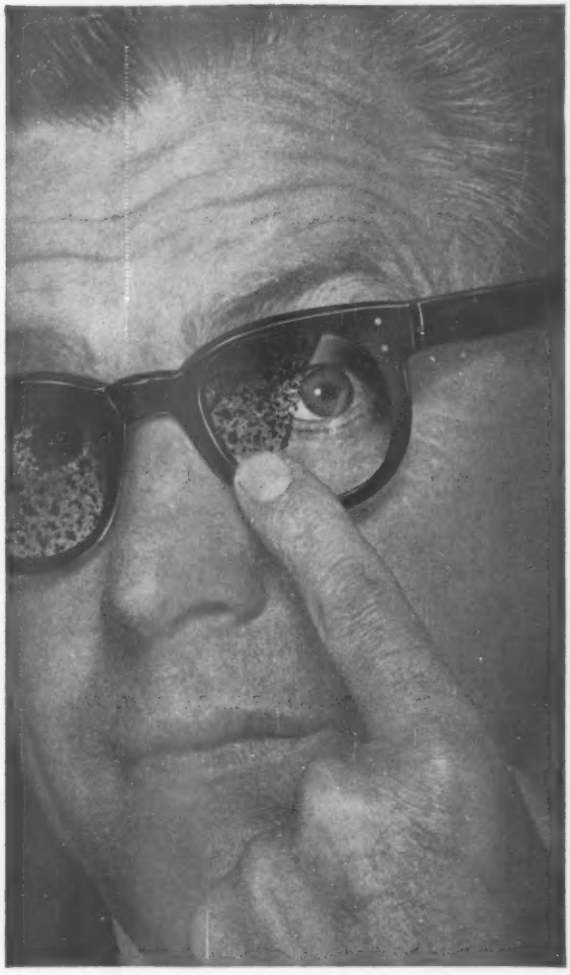
Silicate News, No. 1. Issued by Joseph Crossfield & Sons, Limited, Warrington.

The interesting feature of this new quarterly publication is the variety of industries which it shows to be using silicates. Item No. 12 (the penultimate) refers to the CO_2 Process. Each paragraph detailing the special use to which the silicate has been put, bears a cross-reference, and that for No. 12 is—not unnaturally—to the FOUNDRY TRADE JOURNAL.

New Member for CIDA

The director committee of the *Centre International de Développement de l'Aluminium* (CIDA) met on November 30 in Zürich, with Mr. R. Afflerbach (Aluminium Zentrale, Düsseldorf) in the chair. Representation for Great Britain is by the Aluminium Development Association and the meeting was attended by Sir Geoffrey Bourne, director-general, and Mr. F. B. H. Villiers, member of council of ADA. The committee decided to admit the Netherlands as a new member, to be represented by *Nederlandsche Aluminium Maatschappij*, bringing the total membership to eight. The other member countries are Austria, France, Germany, Great Britain, Italy, Sweden, Switzerland. There was also discussion on the statutes of CIDA and the terms of reference of the various working committees, whose recent work—in particular, that of the documentation and surface treatments committees—was reviewed. The next meeting of the director committee will be in Italy in May, 1962.

A MEMORIAL SERVICE to Mr. Frank Thompson-Schwab, chairman of Darwins, Limited, Sheffield, was held in Sheffield Cathedral on December 12. It was attended by members of the family and representatives of the Darwin group of companies and of Sheffield industry. The Provost of Sheffield, the Very Rev. J. Howard Cruse, conducted the service.



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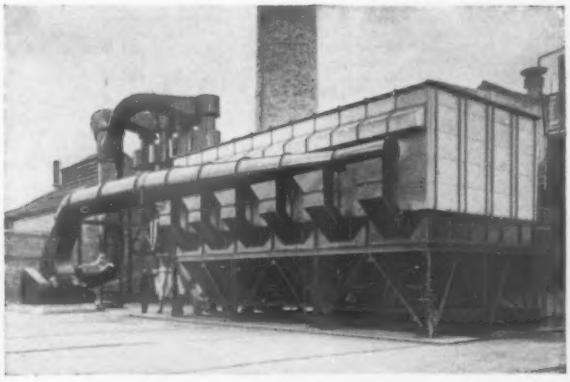

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Imports and Exports of Iron and Steel in October

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in October this year. Totals for the first 10 months of 1960 and 1961 are also included.

Total Exports of Iron and Steel

Destination	Month ended Oct. 31	Ten months ended October 31.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	653	4,902	4,725
Sierra Leone	563	6,098	8,059
Ghana	3,589	19,014	16,551
Nigeria	3,758	50,468	57,008
Union of South Africa	7,743	54,952	51,922
South-West Africa	794	5,039	12,826
Rhodesia and Nyasaland	2,157	22,818	25,587
Tanganyika	3,201	12,756	25,964
Kenya	1,603	24,589	31,979
Uganda	172	1,269	2,053
Mauritius	75	4,070	1,535
Bahrein, Qatar, and Trucial States	1,141	12,403	15,435
Kuwait	61	5,368	17,291
India	10,147	212,913	160,403
Pakistan	3,090	55,254	68,601
Singapore	1,808	17,611	20,910
Malaya	2,425	15,408	22,584
Ceylon	2,074	43,565	31,405
British North Borneo	72	3,852	2,242
Hongkong	9,773	69,231	76,179
Australia	4,757	149,665	102,139
New Zealand	7,353	102,232	180,839
Canada	9,780	177,191	102,918
Jamaica	1,348	20,054	13,785
Trinidad	4,585	32,847	38,176
British Guiana	266	7,518	7,169
Other Commonwealth countries	1,705	21,926	25,015
Eire	6,516	51,849	63,560
Soviet Union	13,203	24,303	41,999
Finland	4,541	40,426	53,314
Sweden	18,096	145,547	141,147
Norway	7,777	97,673	107,822
Denmark	8,240	82,607	86,358
Poland	11,768	9,719	42,497
Western Germany	13,560	116,618	97,649
Eastern Germany	1,421	18,383	19,747
Netherlands	6,954	100,032	95,810
Belgium	1,833	28,231	26,279
France	1,508	7,099	11,217
Switzerland	1,938	12,049	19,270
Portugal	2,611	13,605	24,569
Spain	2,696	40,299	21,538
Italy	9,165	36,260	67,287
Austria	317	4,304	4,613
Yugoslavia	1,214	32,339	23,703
Greece	2,429	17,052	30,581
Turkey	305	17,621	12,030
Netherlands Antilles	110	2,814	1,463
Portuguese East Africa	150	3,806	2,051
Egypt	1,439	11,878	26,230
Libya	4,194	33,669	23,488
Sudan	1,128	8,086	8,803
Israel	1,764	16,326	19,570
Saudi Arabia	20	375	1,051
Iraq	1,681	37,832	28,076
Iran	2,339	60,102	29,649
Burma	243	4,961	5,506
Thailand	426	5,434	4,871
Indonesia	364	20,502	3,322
China	489	45,719	11,031
Japan	22,621	58,363	156,459
Philippine Republic	1,302	6,427	5,237
USA	19,334	172,373	117,447
Cuba	13	6,624	849
Mexico	768	5,085	3,822
Colombia	5,689	7,874	15,062
Venezuela	3,084	30,083	23,425
Ecuador	88	2,479	2,206
Peru	1,017	5,321	7,486
Chile	281	3,603	2,813
Brazil	798	23,339	14,185
Uruguay	894	7,585	7,909
Argentina	18,258	72,121	147,497
Other foreign countries	5,625	51,089	57,522
TOTAL	294,904	2,752,899	2,841,315

BAIRDS & SCOTTISH STEEL, LIMITED—Mr. A. O. Cox has been appointed to the board and has become commercial director.

Total Imports of Iron and Steel

From	Month ended Oct. 31	Ten months ended October 31	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	2,058	25,641	29,986
Rhodesia and Nyasaland	232	6,606	19,399
Canada	3,477	219,708	75,074
Other Commonwealth countries and Eire	1,059	43,411	36,335
Soviet Union	12,514	27,596	35,138
Sweden	4,450	41,119	40,763
Norway	14,041	129,914	98,840
Poland	49	8,645	880
Western Germany	2,681	113,863	22,478
Netherlands	14,536	168,272	101,652
Belgium	2,702	97,900	29,525
Luxembourg	143	13,150	10,273
France	1,044	58,090	16,685
Italy	4	21,606	503
Austria	45	10,333	4,307
Japan	427	5,939	5,406
USA	685	325,647	11,053
Other foreign countries	288	133,271	10,256
TOTAL	61,126	1,450,711	548,553
Iron and steel scrap and waste fit only for the recovery of metal	2,118	221,171	19,896

Exports of Iron and Steel, by Product

Product.	Month ended Oct. 31	Ten months ended October 31	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	19,513	128,450	106,459
Ferro-columbium (niobium)	6	89	76
Ferro-tungsten	144	797	1,119
Other ferro-alloys	363	9,348	3,340
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	7,763	22,024	90,956
Pieces roughly shaped by forging	52	803	1,579
Iron bars, rods, angles, shapes, and sections	194	1,365	1,830
Steel bars, rods, angles, sections, and shapes	52,907	508,443	560,011
Iron plates and sheets	—	528	795
Universal plates	2,540	16,993	15,674
Steel plate, 3 mm. and under 4.5 mm. thickness	1,857	32,569	33,315
Ditto, 4.5 mm. or more in thickness	40,675	287,303	299,002
Blacksheets and blackplate	38,945	247,708	336,937
Hoop and strip	8,627	84,600	93,152
Tinplate	36,095	414,431	350,947
Decorated tinplate	362	5,140	5,238
Galvanized sheets	6,278	68,967	58,002
Other (incl. tinned sheets, terneplate, and ternesheets)	4,047	23,354	34,974
Railway and tramway construction material	5,343	144,120	158,951
Wire rods of steel (incl. alloy steel)	4,875	45,665	51,241
Wire	10,263	98,720	109,004
Tubes, pipes, and fittings	54,055	611,482	528,713
TOTAL	294,904	2,752,899	2,841,315

STEELS PROCESS PLANTS, LIMITED—Mr. K. B. Ross has been appointed managing director of the new company which is a member of the Steel & Company, Limited, group. Mr. R. Olley has been appointed engineering director and Mr. R. A. Chasseaud, marketing director.

Company News

Stewarts and Lloyds, Limited

Group profits, before tax, of Stewarts and Lloyds, Limited, fell from £18,200,000 to £14,000,000 for the year to September 30, 1961, and a final dividend of 10 per cent. on capital increased by a two-for-nine rights issue makes a total of 15 per cent., the same as for the previous year. The net profit, after tax and outside interests, etc., is down from £10,600,000 to £7,400,000. Group sales to customers increased from £139,400,000 to £158,300,000.

Representative outputs for the UK group in 1961, with the corresponding figure for 1960 in parentheses, were:—Pig-iron, 2,321,000 (1,922,000) tons; steel ingots, 1,732,000 (1,870,000) tons; spun-iron pipes and castings, 493,000 (402,000) tons; steel tubes, 905,000 (1,008,000) tons. The 1961 figures for pig-iron and spun-iron pipes and castings include output by Staveley Iron & Chemical Company, Limited.

Capital expenditure on plant and equipment at home and overseas amounted to £10,200,000. During the year capital schemes were authorized up to a total of £42,274,000, of which a large proportion was to provide for the major development of iron and steel capacity at Corby. The balance of the schemes sanctioned now amounts to £47,875,000.

SCOW Profits Down

Sales and other income of the Steel Company of Wales, Limited (SCOW), fell by £10,000,000 to £133,000,000 in the year ended September 30, 1961, and the final dividend is cut from 1s. 6d. to 1s. per £1 ordinary share, making a total of 2s. (2s. 6d.) per share. The trading surplus declined from £30,480,000 to £23,250,000, and after depreciation of £8,333,234 (£8,217,131), taxation of £3,100,000 (£7,400,000), and other charges, the net profit is down from £7,030,000 to £4,930,000.

The company tells shareholders that the recession in demand for sheet and tinplate continued during the second half-year. The export market became much more competitive and prices were reduced. Increased costs were not recouped adequately in the home market.

WESTINGHOUSE BRAKE & SIGNAL COMPANY, LIMITED —Group trading profits fell to £1,747,032 (£2,394,819) for the year to September 30, 1961, and the dividend is cut to 9 (11) per cent. After heavier interest charges and a substantially reduced tax provision, net profit is £782,979 (£1,119,893).

UNIVERSAL GRINDING WHEEL COMPANY, LIMITED—With a final tax-free dividend of 12½ per cent., total for the year ended September 30, 1961, is 20 (same) per cent. on the ordinary and employees' stock. Net profit attributable to the parent company is £567,770 (£600,372), after tax of £627,645 (£646,281).

SKEFKO BALL BEARING COMPANY, LIMITED—Subject to the necessary Exchange Control consent to participation by the parent company, Aktiebolaget Svenska Kullagerfabriken (SKF), it is proposed to raise £1,600,000 by a rights issue early in the New Year. The proposal also depends on market conditions at the time being "not markedly different." The intended issue is of 500,000 £1 shares at 65s. each on a one-for-12 basis.

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SITUATIONS WANTED

FOUNDRY EXECUTIVE (34). Comprehensive technical and practical experience grey iron and shell moulding. Qualifications: mechanical engineering, foundry technology and metallurgy, desires position in technical representative capacity. Box FE241, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN AND METALLURGIST experienced in iron, aluminium and precision casting, desires change preferably in smaller foundry where wide practical and technical knowledge could be used. Prepared to start precision foundry if capital available. Box FA247, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER / CHIEF CHEMIST, fully experienced in non-ferrous metal manufacturing. A.I.D. approved, desires similar position in Midlands or North. Box FM250, FOUNDRY TRADE JOURNAL.

A METALLURGIST IS OPEN TO SUGGESTIONS being laboratory trained and having held EXECUTIVE POSITIONS IN FOUNDRIES since 1957. Experience having been gained with all grades of cast iron and alloy irons including nodular. Using electric melting furnaces and hot blast cupola. Would prefer the West Riding of Yorkshire area but consider other locations. Car owner, H.N.C. Metallurgy engineering background. Any proposition received will be considered and treated in the strictest confidence. Box AM231, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

ASSISTANT WORKS ENGINEER for non-ferrous refinery in London area. Age 20-30. H.N.C. would be an advantage, but not essential. Familiarity with metal melting plant and ability to do own drawings after discussions with production staff main requirements. Prospects of becoming Works Manager within six years. Box AW261, FOUNDRY TRADE JOURNAL.

EXPERIENCED CHIEF METALLURGIST. FOUNDRY SUPERINTENDENTS (two) and PROCESS METALLURGIST required for large steel and iron foundries in South America. Familiarity with automobile castings production and the newer processes desirable. Contracts for 3/5 years or permanencies. Excellent service conditions, including passages, home leave, etc. Box EC239, FOUNDRY TRADE JOURNAL.

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Forms of application can be obtained from the Head of the Education and Training Section, 14 Pall Mall, London, S.W.1.

PATENTS

THE proprietor of the British Patent No. 781233, entitled "Blast furnace cooling plate holder," offers same for license or otherwise to ensure practical working in Great Britain. Inquiries to SINGER, STERN & CARLBERG, 140 So. Dearborn Street, Chicago 3, Illinois, U.S.A.

THE Proprietor of Patent No. 699318 for "A Regenerative Refractory Furnace for Endothermically altering a Gaseous Material," desires to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

BRITISH PATENT No. 716175. "Improvements relating to heat protective garments. Proprietors desire secure commercial exploitation by licence or otherwise. Replies to H. D. FITZPATRICK & Co., 3 Gray's Inn Square, London, W.C.1, and 94 Hope Street, Glasgow, C.2.

AGENTS

PART-TIME AGENT required by North of England Ironfoundry seeking to expand present field of activities. Reply stating experience, type of connection and area covered to Box PT242, FOUNDRY TRADE JOURNAL.

MASTER PATTERNMAKERS in Lancashire, with good connections, seek agency to sell Foundry Requisites and Steel Castings, etc. Commission basis. Box MP238, FOUNDRY TRADE JOURNAL.

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SMALL Aluminium or Non-ferrous Foundry wanted in Midlands area. State details to Box SA224, FOUNDRY TRADE JOURNAL.

WANTED to purchase. Small Non-ferrous Foundry. Melting capacity, 2-3 tons weekly. Details to Box WF248, FOUNDRY TRADE JOURNAL.

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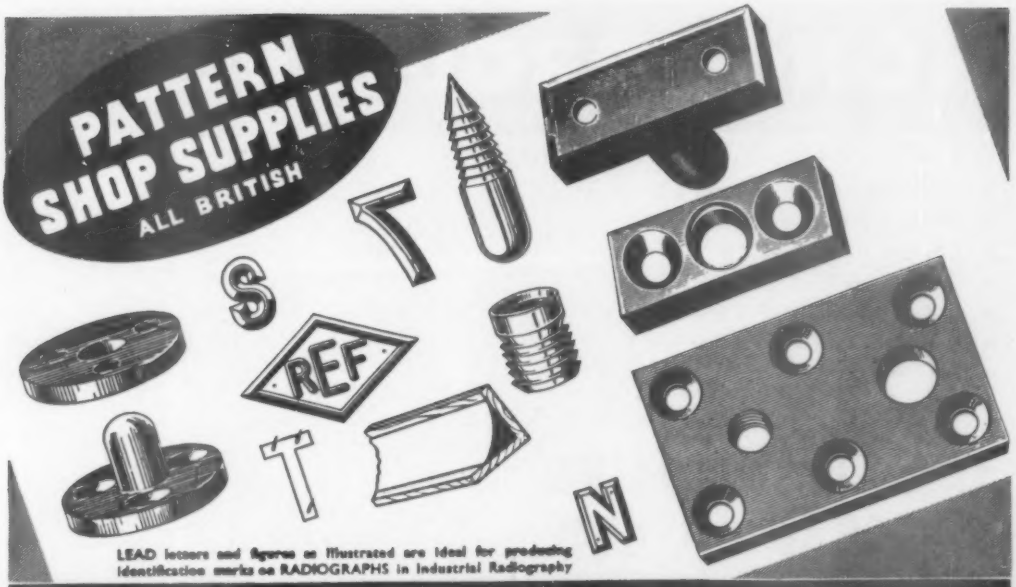
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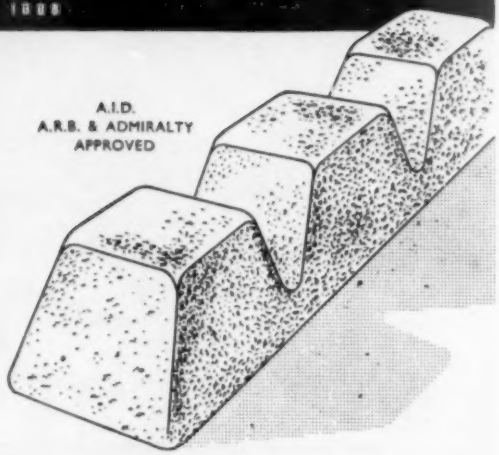

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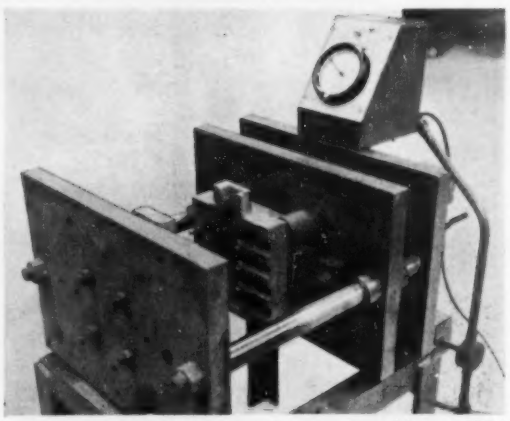

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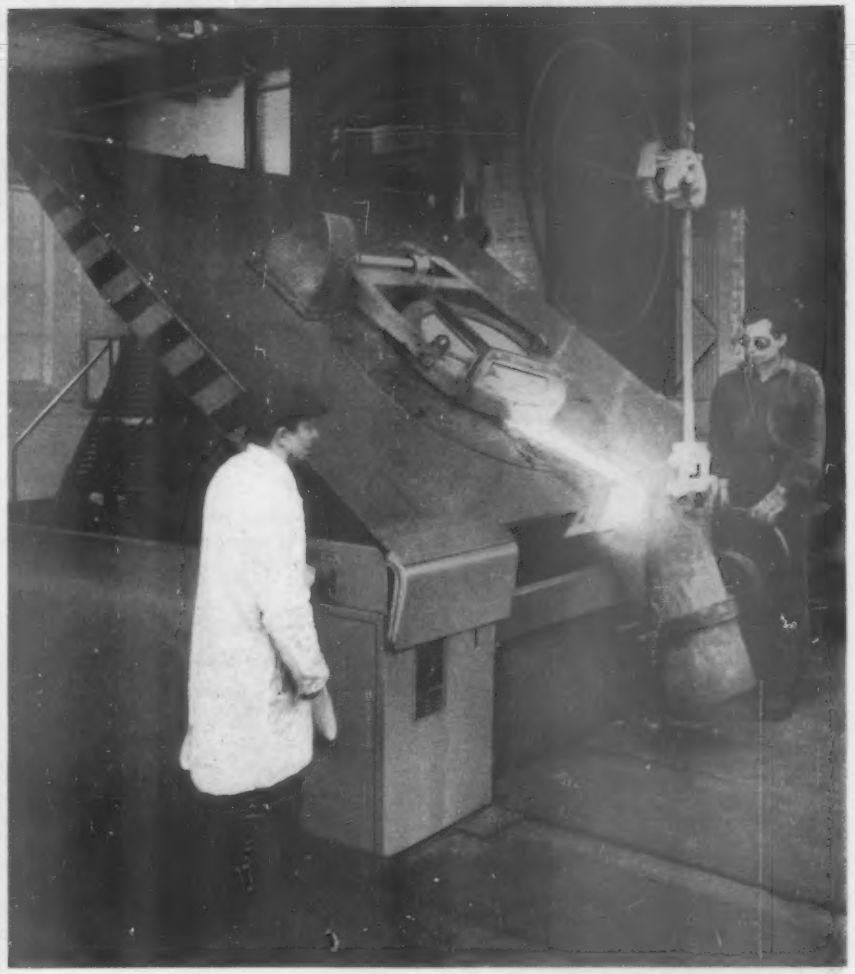

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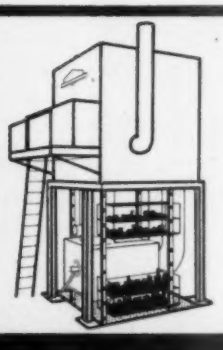

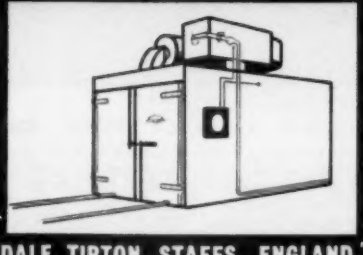

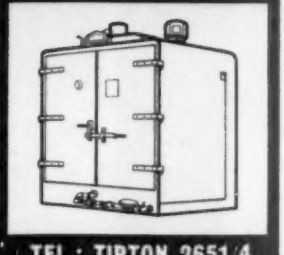

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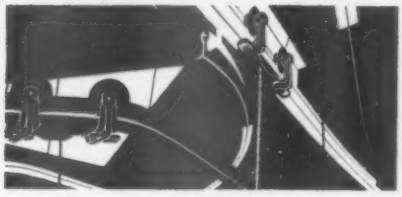

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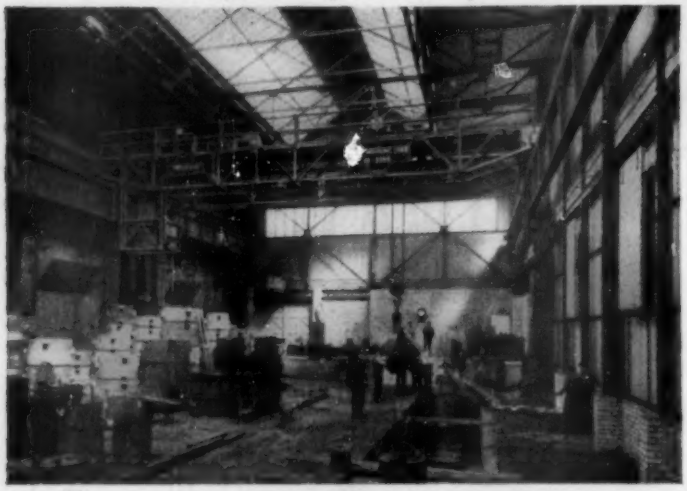

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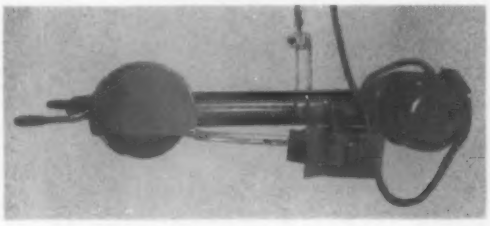

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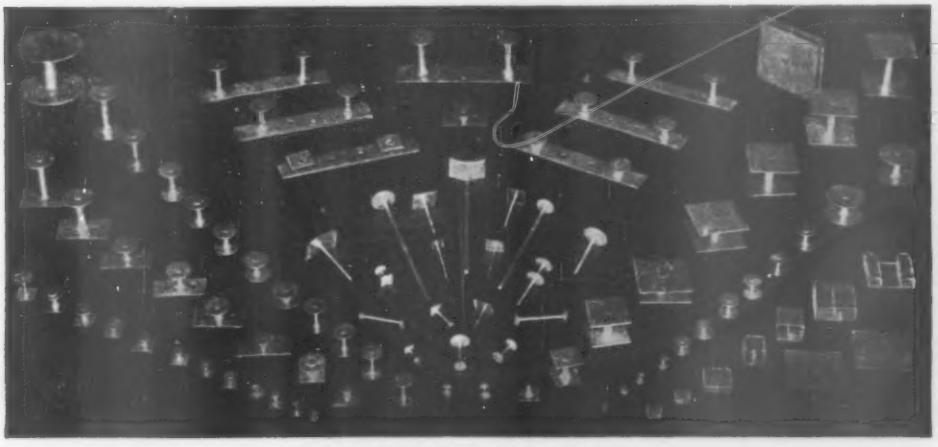

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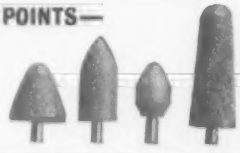

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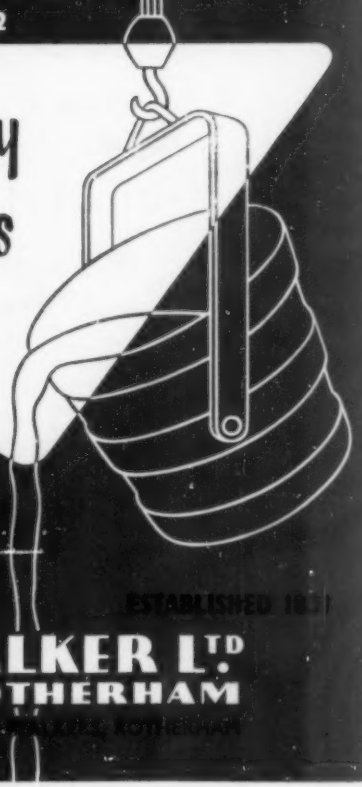

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